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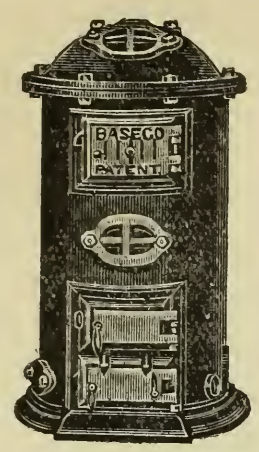

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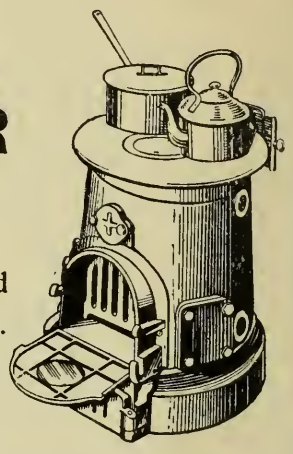

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1885.	Leicester.	Prof. F. De Chaumont, M.D., F.R.S.
1886.	York.	Sir Spencer Wells, Bart.
1887.	Bolton.	The Right Hon. Lord Basing, F.R.S.
1889.	Worcester.	G. W. Hastings, M.P., J.P.
1890.	Brighton.	Sir Thomas Crawford, K.C.B., M.D.
1892.	Portsmouth.	*Hon. President:* H.R.H. The Duke of Connaught, K.G. Sir Charles Cameron, M.D., F.R.C.S.I.
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1899.	Southampton.	Sir William H. Preece, K.C.B., F.R.S.
1900.	Paris.	Prof. W. H. Corfield, M.A., M.D., F.R.C.P.
1900.	London.	Housing of the Working Classes.
1901.	London.	Water Supplies and River Pollution.
1902.	Manchester.	The Right Hon. Earl Egerton of Tatton.
1903.	Bradford.	The Right Hon. Earl Stamford.
1904.	Glasgow.	The Right Hon. Lord Blythswood.
1905.	London.	(School Hygiene.) Sir Arthur Rucker, D.Sc., L.D., F.R.S.
1905.	London.	(Smoke Abatement.) Sir Oliver Lodge, D.Sc., LL.D., F.R.S.
1906.	Bristol.	The Right Hon. Sir Edward Fry, P.C., D.C.L., F.R.S.

Date.	Town.	President.
1907.	Dublin.	*Patron:* His Excellency The Earl of Aberdeen, K.T., P.C. Rt. Hon. The Earl of Rosse, K.P., F.R.S.
1907.	London.	Exhibition in connection with Second International Congress on School Hygiene.
1908.	Cardiff.	The Right Hon. The Earl of Plymouth, P.C.
1909.	Leeds.	(Joint Health Congress.) Col. T. W. Harding, LL.D., J.P., D.L.
1910.	Brighton.	The Right Hon. Sir John A. Cockburn, K.C.M.G., M.D.
1911.	Belfast.	*Patron:* His Excellency The Earl of Aberdeen, K.T., P.C., G.C.M.G. The Right Hon. Lord Dunleath, D.L., J.P.
1911.	Cape Town, South Africa.	Sir Frederic de Waal, Kt.
1912.	York.	*Patron:* H.R.H. Prince Arthur of Connaught, K.G., G.C.V.O. His Grace the Lord Archbishop of York.
1912.	Perth, Western Australia.	*Patron:* H. E. Sir Gerald Strickland. Dr. James Hope, D.P.H.
1913.	Johannesburg, South Africa.	W. R. Boustred, Mayor.
1913.	Exeter.	The Right Hon. Earl Fortescue, K.C.B.
1914.	Blackpool.	The Right Hon. Earl Derby, P.C., G.C.V.O., C.B.
1916.	London.	Sanitary Administration under War Conditions. The Right Hon. The Lord Mayor of London (Sir Charles Cheers Wakefield).
1919.	London.	(Post-War Developments Relating to Public Health.) The Most Hon. the Marquess of Salisbury, K.G., G.C.V.O.
1919.	Newcastle-on-Tyne.	His Grace the Duke of Northumberland.
1920.	Birmingham.	The Right Hon. Viscount Astor.
1921.	Folkestone.	The Right Hon. the Earl of Radnor.
1922.	Bournemouth.	Major-General the Right Hon. J. E. B. Seely, C.B., C.M.G., P.C., D.S.O., M.P.

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Smoke Pollution of the Atmosphere in the Potteries.

By G. PETGRAVE JOHNSON, M.D., C.M., D.P.H., Medical Officer of Health, Stoke-on-Trent. (Member.)

Read at Stoke-on-Trent Sessional Meeting, October 7th, 1921.

DR. OWENS, Secretary to the Committee for the Investigation of Atmospheric Pollution, in a paper read at the Congress of the Institute, at Folkestone, referred to the pottery industry as one of two industries in which it was, probably at the present time, not possible to prevent the emission of smoke and carry on the industry successfully.

The complaint of pollution of the atmosphere by smoke in the potteries has gradually become more insistent. There is no doubt the County Borough is particularly unfortunate, because not only does the pollution arise directly from the manufacture of pottery, the staple industry, but it is also associated with the manufacture of the Staffordshire Blue Brick especially. Further, the amount of refuse resulting from the staple industry is very large, and has to be tipped in various hollows throughout the area. Sooner or later these are set on fire and produce a large amount of smoke. (At times there may be as many as six or eight alight.) There is also, in addition, a number of coal mines and ironstone mines, with the calcining of ironstone heaps. These are, of course, additional to the domestic fires, road engines, boilers, furnaces, etc.

It is estimated that there are some 2,500 ovens and kilns, and 500-600 boiler stacks in the district, and to each oven and kiln there might be on an average six or eight fireplaces. An oven of an average size might consume as much as 12 tons of coal at each firing, once or twice a week. A very large amount of coal is thus used, apart from that used by steam-raising plants. .

The ovens in use are usually the bottle-shaped ones.

In a general way the construction of these ovens is shortly, as follows :—

(1.) The hovel with chimney rising to a height of from 30 to 60 feet.

(2.) The oven proper within the hovel, say 15 feet in diameter, and 15 feet to the shoulder with eight or ten furnaces in the circumference.

(3.) Several openings on the crown for ventilation, to be opened and shut as required.

(4.) The mouth for filling the oven.

When filled with articles to be fired with their containers, the oven might contain as much as 20, 30 or even 40 tons of material, much of it in only partially dried condition, so that there might be as much as two, three or four tons of water to be driven off in the firing.

In the first stage of firing or heating the aim is to dry the contents of the oven by slowly raising the temperature up to from 100° C. to 150° C. In the second stage, among other changes, the combined water has to be got rid of at a temperature of about a dull red heat, say 600° C. to 800° C., and finally the temperature must be further raised to about 1,200° C., so as to produce more or less fusion or vitrification, continued at this temperature, and then allowed to cool.

In firing this type of oven, much, if not everything, depends on the practical knowledge of the fireman, his experience generally, as well as of that particular oven : the idiosyncrasy of every oven must be learnt. The fireman must be able to draw correct conclusions from his test pieces, and from glimpses into the oven : he must be able to heat one section of his oven and keep back another section ; to know when to ventilate the oven and when to check ventilation ; he must not dry the ware too quickly, or else it will crack ; he must even be able to draw correct conclusions from the smoke emitted. If small coal and slack be used, instead of a better coal, greater care is necessary. He must not fire the oven at too high a temperature ; he has eight or ten fireplaces to attend to ; his task is an exacting one. His aim is to produce good ware ; it is not his object to fire his oven without emitting smoke.

In the firing of the glost ovens, *i.e.*, the ovens in which the glazing of the ware is carried out, many difficulties similar to those met with in firing biscuit ovens are encountered, though the process can be carried out more quickly at a somewhat lower temperature ; and the same may be said of enamelling kilns.

From continuous observations it has been found that in biscuit ovens, *in one case* the period of firing lasted 75 hours, and during that time black and moderate smoke was emitted for 27 hours. *In a second case*, the firing lasted $52\frac{1}{2}$ hours, and black and moderate smoke was emitted during 18 hours. During the first hours of drying a considerable amount of steam is mixed with the smoke.

In the case of glost ovens, in one fired for nearly 22 hours there were eight hours of black and moderate smoke, in a second case, fired for 33 hours, there were 12 hours black and moderate smoke.

In the case of one kiln, black and moderate smoke was emitted for $5\frac{1}{2}$ out of ten hours, and in a second case $6\frac{1}{2}$ out of $8\frac{3}{4}$ hours.

Another special difficulty in this district is that in connection with the

manufacture of the Staffordshire Blue Bricks, tiles, etc. In order to produce a marketable brick, it is necessary, at a certain stage of firing, to have in the kilns a reducing atmosphere, in order to reduce the red oxide of iron, and produce the blue colour, as well as to perfect the brick. This reducing atmosphere is ensured by cutting off the air supply, and as a result a large amount of smoke is emitted. The duration of firing the kiln might be about seven days, and the air is excluded for the last 30 hours or so.

At 12 noon on the 16th of last month (September), observations were made through the County Borough (care was taken to avoid overlapping) and it was found that 125 stacks were emitting black smoke, and 107 moderate smoke.

With respect to steam raising plants in the County Borough, when there is one boiler to a stack, three minutes black smoke in the half hour is permitted ; in the case of two boilers 4 minutes ; and in the case of three or more five minutes in the half hour. It is admitted that with proper construction and careful firing, no black smoke, and practically no smoke of any kind should be emitted from a boiler stack. Overworking, an effort to produce an impossible amount of steam, is a common cause of black and moderate smoke emission. Few manufacturers seem to know the capabilities of their plant.

I think that in this district it is probably felt that the amount of smoke from the pottery ovens and kilns is so great as to overwhelm the other agents of smoke pollution, and so little effort is made to reduce the smoke. The heights of the boiler chimneys vary from 80 feet to close on 150 feet, and consequently the nuisance is less keenly felt than in the case of pottery ovens, from which the volume of smoke emitted is large, and is poured from the low chimneys into the streets, offices and dwelling houses. These low chimneys cannot be raised. As you pass through the district it will be noticed that houses are, to a very large measure, built right up to the boundary walls of the factories.

There can be no disputing the fact that there is a serious pollution of the atmosphere by smoke in this area. I regret that there are no instruments for recording the exact amount of pollution, but I am hoping that this will be remedied at an early date.

The Borough is fortunate in that *it is a long narrow district ;* at few points is it even two miles wide from east to west. The atmosphere is thus readily cleared of smoke by slight winds.

There is in the County Borough a somewhat *Excessive Death Rate* from pneumonia and bronchitis (*acute lung diseases*), and it is not, I think, unreasonable to attribute some of this excess to deficiency of sunlight and fogs. Various authorities have, from time to time, put forward statistics which

show a direct relation between fogs and smoke in large industrial towns and a rise in the death rate from acute lung diseases. In this connection I would mention Dr. Niven, Medical Officer of Health for Manchester, the Medical Officer of Health for Glasgow and Mr. Bailie Smith, of Glasgow. There are many others.

I have not been able, through lack of observations, to bring forward any such statistics in connection with Stoke-on-Trent. I thought, however, it might prove interesting to know what, if any, conclusions had been come to by the authorities of Pittsburg, Pennsylvania, U.S.A., where a very large experiment is in progress.

I have a communication from the Director of the Department of Public Health of that city, where smoke laws have been in force since 1913, and where the atmospheric conditions have been consequently entirely altered. He states that " the reduction of the amount of smoke thrown out into the atmosphere is believed to be at least 75 per cent., and the city is a better place to live in from the point of view of comfort and appearance; that the average death rate per 10,000 of the population from bronchitis has been reduced from 3.95 to 2.89; that from Phthisis shows a very slight increase, and that from pneumonia an increase from 25.34 to 38.75. He adds that a puzzling peculiarity about the records is that the disease which shows a decrease has shown a decreased rate since 1873, and those that show an increase have also shown an increasing rate since 1873. The Director states that those specially engaged in consideration of the matter have an impression that the increase in deaths from pneumonia is principally due to sudden climatic changes, and to the effect of street dust, and also to the under ventilation of public buildings and the houses of the people."

In the case of pottery ovens and kilns, even in the worst type, it is found that *with care in firing*, much improvement is possible; works when known to be under observation emit less smoke from their ovens than at other times. Close supervision will bring about improvement lasting for months, and that without unduly harassing the fireman or causing injury to the goods fired. Certain types of the bottle shaped ovens (called down draught ovens) are thought to be more efficient from the point of view of smoke prevention, and some manufacturers are of the opinion that the next step taken should be towards the elimination of all the older types of ovens.

For years past the question of firing ovens and kilns with gas has attracted much attention, and one even hopes that some method may be devised whereby gas produced in sufficient quantity, of right quality, and at a low enough price, might be applied to the ordinary bottle-shaped ovens and kilns, or some slight modification thereof. Though that has not yet been attained to, definite progress has been made, and at present there are in this district

several specially constructed efficient ovens and kilns fired by producer gas, I have heard it maintained in all seriousness that sooner or later these newest methods will have to be adopted generally from the point of economy in use.

There are two chief forms of these ovens or kilns in use in the district at the present time, one is the tunnel oven (Dressler or other form) and the other the Shaw oven. In the case of the tunnel oven, a tunnel is constructed of brick and firebrick. It varies in length from 120 feet to 300 feet. A certain portion of this tunnel, somewhat nearer the exit than the entrance, is heated to the required temperature by producer gas from a special plant. The gas is drawn to the oven by a fan, and cold air is drawn in through the exit end of the tunnel. The goods to be fired are very slowly drawn into the tunnel from the entrance on low trolleys running on rails. The goods thus pass from the entrance through a gradually rising temperature, ultimately passing out through the cooler portion of the tunnel, and at the exit they are cool enough to be dealt with.

In the case of the *Shaw oven*, there is a rectangular structure of brick and firebrick, 60 feet by 100 feet, containing 16 chambers or ovens. Producer gas from a special plant can be passed into any of these chambers, the first chamber is heated gradually to the required temperature for the necessary length of time, the waste heat passing to the succeeding chambers towards the chimney, gradually raising the temperature of the chambers. When the goods in the first chamber are sufficiently fired, the gas is turned into the second chamber, and the first begins to cool ; and so on until the last is fired, and the first and others unpacked.

In the tunnel oven the goods are moved on into and through the heat, and in the Shaw oven the heat is moved from chamber to chamber while the goods are stationary.

These gas fired ovens and kilns are now established on a firm basis in the district, and they solve the problem of firing without the emission of smoke. There are, however, various difficulties in the way of their general adoption, and the following are some of those which have been put to me :—

(1) It is not yet sufficiently proved by practical experience that these ovens and kilns can be used for all kinds of ware, and for all purposes.

(2) The first cost of these ovens and kilns is prohibitive to many manufacturers.

(3) The space required is so great that they can only be erected under present circumstances in a comparatively few factories. In many instances the factories are so surrounded by dwelling houses that these must be demolished before developments can take place ; and

(4) For smaller firms these ovens are too large to allow economical working.

Discussion on the Administrative Measures necessary in regard to the Slaughtering of Animals, and the Storage and Transport of Meat, in connection with the Report issued by the Ministry of Health.

Opened by W. M. Willoughby, M.D., D.P.H., Medical Officer of Health, Port of London. (Fellow.)

At London Sessional Meeting, February 14th, 1922.

WE have before us the Report of the Departmental Committee on the Legislative and Administrative measures necessary to secure adequate protection for the health of the people in connection with the slaughter of animals and the distribution of meat for human consumption.

Unfortunately it arrives at a moment when the opponents of its conclusions with some truth can raise the undiscriminating cry that we are already too closely governed. But this matter of meat regulation is at present, and has always been, one in which licence not liberty has obtained, and no real check whatever has in many districts yet been placed on the purveyor of " screw " material. Three several Inspectors in the Port Sanitary Authority have casually rejected massive tubercle which has been supplied to their households at the price of honest meat. Their somewhat solitary discrimination just indicates the general lack under which disgusting material can be and is forced on an unsuspecting public in the absence of regulation.

The subject of regulation divides itself into two parts, first Tuberculosis, then other considerations and diseases.

I seem to see the present position with regard to bovine tubercle and health in a few generalisations.

1. Bovine tubercle is very common among cattle and swine.
2. Bovine tubercle is with difficulty conveyed to man.
3. Bovine tubercle is more easily conveyed to children.
4. Bovine tubercle by inoculation conveys immunity to human tubercle.
5. The vast majority of people over the age of six show a degree of immunity to tubercle.

These suggest that the age-long mutual association of bovine and human beings with interchange of bacilli has produced in man first in course of evolution the typical bovine strain of bacillus and the consequent natural environmental immunity to this strain, and further an inoculation immunity acquired with years in the life of each of us to all strains of tubercle bacilli.

The Commission would seem to have touched on the point when (p. 27) it is stated : " Any measures which may be devised for stamping out tuber-

culosis in cattle would be of great value to the consumer not only in regard to meat, but also *in the more important matter of milk.*" (My italics.)

Milk is the chief source of contraction of bovine tubercle by man, or rather the child of man, not meat. It would seem that generally speaking the bacillus must come straight from active lesions in the cow to the best human culture medium, the child, in order that its hold may be established, and it is then established only with difficulty and relative rarity, considering the amount ingested and the numbers ingesting.

The point becomes of great importance in administration, for it will be noticed that the excellent appendix II. to the report leaves latitude for tender judgment of the tuberculous carcase, whether of swine or bovine, cutting out completely for swine the suggestion that tuberculosis, however slight, should lead to the condemnation of the whole carcase.

It is obvious that a complete system of licensing and registration of premises for slaughter, the prohibition in general of slaughter except upon licensed premises and inspection at or soon after slaughter would at once rid the community of the grossly tubercular material which can at present be foisted upon it as food, and clear the way for discrimination on the fine points which already arise for judgment of a carcase in well-managed centres.

Lack of uniformity in judgment and variation in the amount of inspection as between two districts would be at once enormously lessened, for obvious tubercle would hardly be marketed as meat in either under the schedule of inspection proposed.

It is in this removal of grossly tuberculous material that I see the immediate benefit to the public. The almost immediate effect of the foreign meat regulations of the Local Government Board was just such a disappearance of gross lesions from imported foreign meat. The slaughter in large abattoirs with inspection, even though carried out abroad, meant a big advance in the direction of clean food, making foreign meat at present, in my opinion, equal if not superior to the home product because of inspection at centralised slaughter-houses, despite the disadvantage of frost.

Under the inspection of this foreign meat which takes place at our ports, tuberculous lymphatics are found in pigs from time to time. The practice in the Port of London has been to seize the whole carcase when the tubercle has been so apparent that on examination here it is judged that the examiner on the other side of the water ought to have saved his bacon there. It will be remembered that the Port Officers have not got the viscera before them in connection with the carcase, while the presence of the viscera is rightly insisted on in the report for the inspection of home produced carcases. This seizure is avowedly made without reference to finesse in judg-

ment of the tuberculous state of the carcase, for which the data are absent with the viscera, and it can hardly be questioned as a correct procedure.

I do not anticipate such rigour for home meat ; the schedule should be adhered to.

As I have said, gross lack of uniformity as between district and district will be immediately lessened, whatever the variation in finer judgment, provided the inspectors have more eyes to see and opportunity to exercise them, for what more infinite discrepancy can be found than between say the Islington Market inspection and the total lack of inspection in many districts. It is after these gross discrepancies have been removed by systematised inspection that the opportunity for finesse in judgment must inevitably lead to the desirable close scrutiny.

The greatest effect of regulation would, however, be immediate.

Clean handling and transport are matters which might easily be regulated, so far as to overcome the flagrant defects in present methods. Powers are needed by every Local Authority, under which the methods used may be effectively scrutinised to ensure that they will be such as will not lead to soiling and deterioration of the food on handling.

As far as the Port Sanitary district is concerned, the methods of handling are clean, and seen to be clean without more than the lifting of an eyelid on the part of an inspector, and as I believe, with the active help of everybody concerned with or interested in the meat. The position at present is that to secure cleanliness in handling is nobody's duty in particular, whereas it should be everybody's in general. As far as I have seen the present handling is clean : it could be cleaner. I speak now only of the Port of London Sanitary district. But defective methods of handling and transport are not anywhere easily hidden and the same remarks as regards ease of regulation would, perhaps, everywhere apply. This would be an easy duty for a sanitary or a food inspector.

Railway transport is a special subject, and will, I believe, be dealt with as a trade matter of very great financial importance to everybody concerned, importer or consignee, railway company and purveyor. Between slaughter house and railway van, and railway van and shop the meat should be, throughout, under supervision of the several Local Authorities as to condition of conveyance.

I mentioned an inspector as a person with eyes and legitimised opportunity to use them. This should imply a qualification such as that found in the meat inspector's certificate of the Royal Sanitary Institute. The major part of the work would, I anticipate, be carried through by inspectors who do not, I think, distinguish between actinomycosis and actinobacillosis on the one hand and would not hunt for cysticercus as a disease producing condition in

twelve days frozen material on the other. Neither thrix-splitting pseudo-science nor ignorance should find a part to play in the practice of the scheme, for both are costly and non-effective.

An expert to direct and set up criteria and in reserve to make decision in difficult cases whether veterinary officer or medical officer of health, will be an essential. In this connection I would suggest that every medical officer should be in a position to readily apply the extreme intimacy of his knowledge of the processes of disease in general to those found in the body of the various species of food animal.

A sanitary side to an inspector's training is a necessity, it is comparatively of late only that clean handling of meat has been found of literally vital importance, especially in the matter of prepared cooked meats; in the ptomaine poisonings wrongly so called. A knowledge of slaughter-house inspection on this sanitary side is readily seen to be essential. Scrap meat is forbidden entry to the ports as liable to savour of the slaughter-house floor. It should be seen that the same undesirable element does not enter into the pork pie.

In the Port of London the sanitary inspectors have taken the food inspector's certificate of the Royal Sanitary Institute. Such qualification entitles them to a scale of pay which is higher than that of sanitary inspector, and carries with it the duty of acting on occasion as food inspectors. It would seem to me that unless the creation of a new army of officials is contemplated in connection with food inspection the double qualification for sanitary inspectors affords a ready means of raising the status of this useful body of officials with advantage to the public. The sanitary side of meat inspection in the supervision of the slaughter-house and of cleanliness in the method of handling and transport, throughout the whole passage from source of supply down to the consumer, is one which should draw the two matters of cleanliness of meat and freedom from disease in meat, together in the one mind as being complimentary aspects of public health. Whether this suggestion appeals or not, it would seem that the present food inspectors, should it be their function to inspect carcases with their viscera at a slaughter-house, would have their work made easier and much more effective, and at the same time less invidious as being centralised and inspectional, instead of diffused and detective.

I feel hardly competent to discuss the subject of compensation. I would have hazarded a quick conclusion that every business should carry its own risks, whether farming, meat purveying, shipping, or business of whatever nature, and should not appeal to the public purse. I have a suspicion that in any case the public eventually pays the risk, but after all it is the consumer that has the protection if the trade is more closely watched. In my opinion,

if monetary loss accrue to the trade through the disclosure of tubercle and disease, the incentive to tubercle-free herds and tubercle-free meat is strengthened thereby.

You will have found on reading the report that it is condensed, full, and readable, and giving points which should show the way to a full sanitary control of meat. In special we shall, I think, welcome the Appendix II., with its system and schedule of inspection, as conducing to uniformity. I would the inception of the work of control from slaughter-house to marketing basket were plainly in sight, for the report, while leaving little to say on the pleas for control, has shown how much there is to do as soon as that control is made effective.

By J. A. Dixon, M.R.C.V.S., Veterinary Inspector, Leeds.

TO those of us who are engaged in meat inspection and have given due consideration to that subject, the perusal of the Report of the Departmental Committee which we are invited to discuss arouses only disappointment. Disappointment because it contains very little useful information which is new to us, and no useful recommendation which all progressive municipalities have not already adopted or wished for power to adopt. I suppose that in view of the slow progress made in such matters by the Legislature of this country we must regard as an advance the mere publication of such well-known views and long-wished-for reforms in an official document, and continue to hope that the pious aspirations therein contained may be translated, in the not too distant future, into something more tangible and useful.

I dare say the neophyte in this subject will suppose that the object of such an enquiry was primarily to consider the establishment of a greater control over the trade in meat, but it appears to me deserving of notice that the organised meat trade itself appealed for improvement in these matters before the Government could be induced to move.

With most of the suggestions and observations contained in the report all progressive persons must be in agreement, but there exist certain details deserving of discussion.

The question of private slaughter-houses is a vexed one, and there appears to me no real reason why provincial cities and towns should still have to put up with registered slaughter-houses and bye-laws to control them based on a statute of 1847 and very little amended since that time, whilst London has a considerably greater control of granting licences for such places, subject to annual renewal, but so long as registered slaughter-houses exist one cannot

urge too strongly the Local Authorities' need of some power to prevent the overcrowding of such premises, that is to say, the Local Authority should be given power to grant or refuse permission for other persons than the occupier to use a registered slaughter-house. It would appear hopeless at this juncture for Local Authorities to attempt to suppress all private slaughter-houses. Before such action is possible the traders must be provided with adequate, satisfactory and convenient places for slaughter, and even with the modern improvement of transport due attention must be given to the accessibility of such public slaughter-houses for all butchers in large towns, and it appears only just that the Local Authority should be called upon to prove the existence of such satisfactory slaughtering accommodation before they are permitted to suppress any private slaughter-house.

Paragraph 7 with four especial recommendations dealing with places where animals should be slaughtered meets with entire approval, but it should be added that the Ministry of Agriculture and Fisheries or anyone acting under their authority should be called upon to notify the Local Sanitary Authority of any slaughtering of food animals carried out on a farm by their orders.

Paragraph 8, dealing with meat stores and meat shops, with its suggestion that the occupiers of all such premises should be registered, is also good, but is it to be inferred that those suggestions extend to factories for the production of made-up articles of food such as sausages ? Such places are subject to inspection as to the soundness of food deposited therein, but it would appear that they would be much better controlled, and could be made more satisfactory if the Local Authority had the power of registration and could enforce a proper standard of cleanliness and the means to obtain it, as suitable structures, fittings, etc.

I cannot agree with paragraph 10 regarding the licensing of slaughtermen. In a public abattoir, at least, such licensing is essential in the interests of both proper slaughtering and humanity. The trade as a whole is not to be blamed in this matter. They naturally adhere to the old and known method of felling, and trust their men to be proficient, but from various causes slaughtermen occasionally lose their proficiency and care ; there is no difficulty in the proper officers of the Local Authority satisfying themselves that a slaughterman is efficient before granting a licence. This raises the question as to which Committee of a Council should control the public abattoir as distinct from the wholesale meat market. The two places are essentially separate, and whilst the wholesale meat market is properly the charge of the Markets Committee, the Health Committee should control the slaughtering establishment, and the Health Committee's officers should have power to suspend the licence of a slaughterman for serious misbehaviour or inefficiency. For

another reason the abattoir should be the charge of the Health Committee. One of the principal reasons for the provision of a public abattoir is improved sanitation, and although the establishment should be run with due regard to commercial principles, it should be remembered that, unlike a market, it cannot be looked on for a regular and satisfactory profit, but should be regarded as part of the town's sanitary equipment. Its control by Health Officers would lead to a higher standard of cleanliness and management.

As to meat inspection, the lack of uniformity, mentioned so prominently in the report, is deplorable. All these points were mentioned in a paper read before the Conference of Veterinary Inspectors at the Royal Sanitary Institute Congress at Birmingham in 1920, and suggestions were contained in the same paper for the remedy of such defects. The only thing now required is a proper appreciation of the importance of meat inspection on the part of many Local Authorities.

Paragraph 16, with its four sections, is of great importance, but I would add to section (*b*) that where several carcases are retained for inspection the offal belonging to each carcase should be kept separate and properly marked to identify it with its own carcase.

Meat marking is not new. This subject was discussed at the Royal Sanitary Institute's Congress in Belfast in 1911, and the late Mr. Jordan, Veterinary Inspector for that city, gave a demonstration with a branding instrument for the purpose, which was fixed to any electric lamp holder. Before we in this country could usefully establish a system of meat marking we have a long way to go in the organisation and improvement of an efficient and complete system of meat inspection.

The suggestion that meat slaughtered in a rural district and transported into a town should be submitted for inspection and marking is practically a suggestion that the "clearing-house for meat," provided by the Public Health (Scotland) Act should be introduced, and this is only another instance which serves to emphasise the need for meat inspection legislation of provincial England being improved up to the level of London and Scotland. On the whole, provided that an efficient meat inspection service exists, meat marking is to be approved, and, as the report says, it should be subject to control by the Ministry of Health, as, indeed, should the whole meat inspection service.

Paragraph 21 makes an important suggestion, namely, that marking of approved carcases by the inspector would relieve the butcher from his responsibility as to disease, which is, I think, a definite step in the right direction. It has always appeared to me that the unsound food provisions of the Public Health Act, 1875, assumed that disease could in all cases be

immediately detected by anyone without previous training or education, but in the present state of our knowledge of animal diseases that seems too great a responsibility to place upon the butcher. It is recognised now-a-days that the butcher is not always responsible for any unsound condition which may be found in an animal he has purchased in apparently good health, and it is also recognised that even experts in animal diseases cannot in every instance, by examining animals in markets, detect with certainty the presence of disease even when considerable. It would appear to be more fair if such facts were recognised by law, and the responsibility of detecting disease was placed upon persons specially trained and appointed for such work, but at the same time, as the report remarks, the butcher must always be held responsible for the ordinary changes of decomposition which may develop in meat however free from disease.

The qualifications of inspectors receives due notice, and the scheme suggested for an efficient service is good, but it is not new. Practically the same scheme, with especial regard to the organisation of a meat inspection service in rural districts, was suggested in the paper already mentioned and read before the Royal Sanitary Institute at their Birmingham Congress in 1920, but I can find no acknowledgment in the report of the source of this inspiration.

We inspectors will all feel indebted for the exhaustive schedule of inspection and detailed instructions contained in Appendix 2, but as the Report duly acknowledges that information is not new, but was obtained completely from the officials of the Scottish Board of Health, the schedule of diseases has for long been acted upon by all veterinary meat inspectors. At the moment such instructions must be regarded as an ideal which we must strive to attain, but much remains to be done in the education of lay inspectors and in the organisation of the service before we can reach such a state of efficiency.

On the training and examination of inspectors I do not know what criticisms have been levelled at the system which has been in operation for many years, thanks to the enterprise of the Royal Sanitary Institute. Candidates for their examination are required to give to the examining body satisfactory evidence that they have received practical training, and they are examined by men who are thoroughly acquainted with both the theory and practice of meat inspection, whilst many progressive Local Authorities or their veterinary meat inspectors have for years provided facilities for the practical training of such students. What improvement would be effected by the Ministry of Health undertaking that work I cannot see, but whoever undertakes the training and examination of meat inspectors, it cannot be too strongly emphasised that the examination must be so arranged that it is impossible for the pure theorist to obtain a diploma of efficiency. Such

men constitute an annoyance to the trade, a very probable source of expense to the Local Authority who employ them, and a danger to the public.

I regret that I cannot congratulate all medical examining bodies for the Diploma of Public Health on their respect for meat inspection in that examination. My, perhaps limited, observations in that respect have led me to believe that in many instances gentlemen have been rewarded with the Diploma of Public Health who possess no real knowledge whatever of meat inspection, either theoretically or practically. I would at the same time insist that the mere qualification of Veterinary Surgeon is inadequate. Both medical practitioners and veterinary surgeons require further instruction of a practical nature before they can be regarded as efficient meat inspectors, and I am convinced that in the end the veterinary surgeon, from his previous training in animal diseases, will be the more efficient officer, and, further, that the veterinary meat inspector is the most capable teacher of meat inspection for either professional or lay students.

Part III., dealing with slaughterhouses, public and private, must be agreed to, but I would repeat that in all cases due consideration must be given to the needs of the trade, and it seems to me that such consideration would necessitate the provision of concentration slaughter-houses as suggested in the Report. Some experiences of such concentration slaughterhouses was gained during the period of Food Control, and such experience served to impress one that such establishments should be owned and managed by the Local Authority. It is not fair to ask a number of butchers to use a slaughter-house which is the property of one of their number. Under such circumstances friction is bound to arise, and this can only be avoided by municipal ownership and management, which could at the same time be expected to maintain a higher standard of cleanliness.

With respect to the transport and handling of meat, whilst fully endorsing all the complaints against rail transport, I suggest that further complaints could be made respecting the rail transport of live animals. As in the case of dead meat, unnecessary delays occur, and too frequently animals are found to be so severely injured by extensive bruises that their carcases are almost, and sometimes quite, worthless. The competition of motor transport may stimulate the railways to the better handling of dead meat, but legislative action as to the better construction of railway trucks and more careful and speedy transport will be needed to improve the live animals' treatment.

As to the transport and handling of meat from wholesale meat markets to retailers, from a sanitary point of view one cannot too strongly condemn the methods practised in most large towns. So far as I am aware there is no provision made for a Local Authority to make and enforce bye-laws on

this point, and as a result an extensive business of meat carrying has grown up quite beyond the Sanitary Authority's control. The meat trade proper is not wholly to be blamed for this. In many instances they have made attempts to improve affairs in this respect, but as the meat-carrying trade is an entirely separate organisation they are almost as powerless as the Local Authorities. What is needed in this respect is power for the Local Authority to grant licences to meat carriers, such licences to be granted only when the Authority is satisfied that the vehicles provided are of a suitable and satisfactory nature and maintained in a thoroughly clean condition, and also that the men concerned in handling the meat should be clean and always provided with satisfactory and clean clothing.

The Report next deals with the question of compensation to butchers for the destruction of unsound meat, and much attention is given to the aspect of insurance in this matter by several methods. So long ago as 1910 this matter was discussed thoroughly at the Royal Sanitary Institute's Congress at Brighton, and I see no reason to depart from the views I then held and expressed, which are briefly as follows : Quite plainly I see no reason why the butcher should be compensated for being prevented from selling to his customers an injurious substance any more than any other trader, but I maintain that he is entitled to compensation, though not from the public, either as taxpayers or ratepayers. I think it could be assumed that every animal brought to a fat stock market is brought there for the purpose of food for man. It is for that purpose that it has been bred and fed, and the feeder should be held responsible for his product, and called upon by law to refund to the butcher the full price when the carcase of such an animal is found to be unfit for the purpose for which it is purchased. Consider the position. The farmer has the animal under his observation usually for some months. It is his business to watch the animal's progress, and it does not take an experienced feeder long to detect that a certain animal is not growing as fast as its fellows or as fast as it should do. He next notices that this animal is actually losing weight, and I fear his next procedure is to send it to the market or sell for disposal to the butcher. The butcher attending the market sees the animal for a few moments, and has no opportunity of knowing that it is an animal which has refused to develop or has lost condition, or he would not purchase such an one. He purchases it for what it appears to be at the moment, neither fat nor lean, but with no evidence of disease, and on slaughtering he finds extensive tuberculosis. Surely the feeder who produced such an animal should be made to suffer the loss. The chain of events here sketched is suggested to me by the great frequency with which we find bovine carcases with generalised tuberculosis just visible, and in carcases which are by no means wasters. The Tuberculosis Order of 1913 was doing

a large amount of good in eliminating tuberculous cattle, but I fail to see as yet any effort on the part of the agricultural community to rid themselves of this plague, and I fear that so long as the financial loss resulting from their want of activity in this respect can be so easily passed on to other persons, the agricultural community will retain its calmness and serenity. The whole subject of insurance does not appeal to me in the least. The responsibility should be placed by law upon the farmer, and at the same time the Government should assist the farmer to get rid of tuberculosis by a comprehensive Tuberculosis Order energetically enforced.

With the summary of conclusions I agree, with the reservations already mentioned in greater detail, and it is to be hoped that the Government will soon take steps to amend the law on meat inspection, and not leave us in our present position of attempting to control private slaughterhouses by enactments for the most part 75 years old, and to carry out a service of meat inspection on a law 47 years old.

By J. Edwards, Member of the Departmental Committee: National Federation of Meat Traders.

THE Chairman has told you that this Departmental Committee was set up owing to the action of the meat trade. A very representative body, the National Federation of Meat Traders, together with the Wholesale Master Butchers' Federation, sent a deputation, which waited on Dr. Addison, to plead for compensation for confiscation of diseased animals purchased in bona-fides. The retailers also put up recommendations and proposals to bring about many reforms in respect of the meat trade generally. The trade has suffered very considerably in the past from the lack of uniformity, both of inspection and as to the basis of condemnation ; in one district there may be no inspection whatsoever, and in another district all carcases are inspected. One qualified meat inspector will have one idea as to what should be condemned, another equally qualified man will have quite a different opinion. The practice of slaughtering of animals is equally chaotic, there being various methods of licensing slaughterhouses, and my experience, gained serving upon this Committee, astonished me in many ways, but none more than that, in many rural districts animals were regularly slaughtered in unlicensed premises, and perhaps this practice has been more general during the past six months than for many decades past. The National Federation is desirous to do what it can to uplift the standard, and

to raise in every possible way the ideals of the employers and employees engaged in this important industry. We are desirous of eliminating the "screw butcher," the man who deals in animals that are obviously diseased, or at any rate obviously have something wrong with them. When dealing with these questions at the Ministry the meat traders felt that the instructions to the Committee were not sufficiently wide. They were to deal with the legislative and administrative methods necessary to secure adequate protection for the health of the people in connection with the slaughter of animals and the distribution of meat. We desired to go to the root of the question; this basis can only be reached by adopting the method suggested by Mr. Dixon, namely, ante-mortem examination of animals. I would like to see veterinary inspectors appointed to the duty of examining all milch cows, wherever they may be, and when they find tuberculosis of the udder (which I am afraid is rather prevalent), to possess the power to seize them, also such animals as I have previously described. Everyone will realise the fact that milk which, being often used for human consumption without any form of sterilisation, must be infinitely more dangerous when derived from an animal suffering from tuberculosis than the flesh from such an animal which is always cooked. The National Federation of Meat Traders stand by their original claim for compensation for confiscation, as stated in Memorandum No. 1 to the Committee's Report. We believe, which belief is founded on practical experience, that this disease can practically be eliminated by right methods, but this can never come about until the authorities are prepared to go to the root of the question. If public funds were used to compensate the butcher (which would only be just), investigation into the causes of the disease would be put in action and remedies applied. Whilst the farmer suffers no loss from this terrible national waste of breeding and rearing and fattening tuberculous animals (a process which takes at least three years), we cannot see any hope of improvement. It has been said that the Committee has brought forward no new idea; possibly this would be almost impossible after the thorough discussion lasting ten or twenty years, but suggestions have been put forward towards helping a better administration of this industry. It will be remembered that during the late period of control all food animals had to be slaughtered upon licensed premises, all persons dealing in meat were also licensed. The Committee recommended that this should be continued, also the practice of sending in returns of slaughtering. Unfortunately, these orders were all revoked last autumn. We recommend that they should be reinstated, and that no killing should be allowed except upon licensed premises; that all premises used for the sale of meat, wholesale or retail, should be also licensed, and we would add to these all places where meat is stored, and I suggest, for the ensuring of the

better handling of meat, that all vehicles used for the cartage of meat should also be licensed. The question of meat marking was thoroughly discussed, and it certainly would be found necessary where meat is imported from one area to another that this should be done until a uniform system, or as near to it as we can get, is in operation all over the country. Whatever reforms are put into operation, I appeal to this Institute to support the application of them to as large an area as possible, because the honest meat trader suffers through a lack of uniformity.

By H. Adams, President Elect National Federation of Meat Traders.

MUCH stress has been laid upon the transport and handling of meat in markets, and in conveyance from market to the retailer's premises, either by rail or road. I heartily agree that this is of great importance, and there is still much need for improvement in this particular. All possible care should be observed in handling such a food as meat, which peculiarly lends itself to contamination from dust and other impurities.

A few years ago, I repeatedly called attention to the way in which meat was deposited on the roadway and footpaths outside Smithfield Market without proper protection against contamination, and I am very glad to know that there is less to complain of in this way than formerly, although there is still room for improvement. The same remark applies to the conveyance of meat from Smithfield to the various districts in and around London. Great advance has been made in the construction and covering of carriers' vans, many of the new motor lorries being completely enclosed when loaded. Many traders also use their own motor vans, which leave nothing to be desired in cleanliness or protection from dust.

It is certainly of vital interest to the retail meat trader that his stock should be placed in his shop in the cleanest possible condition. But while much has been said on these lines, very little attention has been given to the growing custom of exposing meat for sale on open stalls in the gutter without any protection from the dust, animal excretions and other impurities which abound, especially in dry, windy weather.

A city doctor writing to the press recently referred to the disgraceful way in which meat was conveyed through the streets, but made no reference to the exposure on stalls of which I have spoken (sometimes actually over the sewer gullies), while frequently the meat is packed on the ground

around the stall. During conveyance from the market to the shops the meat is in carcases or quarters, and is never without covering of some kind, but on the street stalls it is cut into hundreds of joints and pieces. Storage is also in these cases an important factor. In some cases it has been found to consist of a stable, and in others, a living room.

One of the principal suggestions put forward by the National Federation representatives on the Meat Inspection Committee was the continuance of the system of licensing traders and registering premises, in vogue during control, and this suggestion was welcomed and endorsed by the Committee. Much to the surprise and annoyance, however, of the Federation that system was suddenly scrapped without notice, and nothing put in its place, with the immediate result of an enormous increase in the number of street stalls for the sale of meat. Only recently I have been informed of the erection of stalls for the sale of meat on an open space, in one of our great cities, which is nothing less than a rubbish heap, and the Local Authority, when appealed to, confessed they had no power to interfere. Surely the British public need education in these matters, especially when we know that this form of trading has been encouraged because it was calculated to promote competition and so reduce the price of meat.

Street trading in some commodities may be a distinct advantage to the poorer class of purchaser, but meat should be rigidly excluded from this category, and the greatest possible care be taken that it is passed on to the public in a clean and uncontaminated condition.

The Carrier Problem in Disease.

By G. L. Leggat, O.B.E., M.B., D.P.H., Assistant Medical Officer of Health, Norwich.

Read at Norwich Sessional Meeting, February 17th, 1922.

THE discussion which I have the honour of opening this evening is one, I frankly admit, I approach with a certain amount of diffidence. Our knowledge of the subject in relation to the human carrier is limited to a few diseases ; the fact that carriers are known to exist in relation to these few indicates that other diseases in which the causal germ is not yet known are probably, if not certainly, spread in a similar manner ; further, in the diseases definitely proven to yield carriers, treatment of this source of infection has so far been distinctly unsatisfactory ; and with treatment more or less at a discount, control must obviously be inefficient.

I propose to discuss briefly the carrier in relation to a few well-known diseases endemic in this country, touching on the question of treatment and control as I proceed.

The carrier, or more correctly " germ carrier " may be defined as a person who harbours, and disseminates, the virulent germs of a disease, without himself presenting at the time, any clinical symptoms of the disease. Carriers may be grouped into the following classes :—

1. Those convalescent from the disease in question.
2. Those in the incubation period of the disease, the so-called " precocious " carrier.
3. Those who have not recently had the disease and who do not subsequently develop it, despite the fact that the causal germ in a virulent condition continues to exist in some part of their body. This class may be conveniently spoken of as the " healthy carrier."

The term " contact carrier " is frequently employed in relation to members of this group in whom recent direct contact with a case of infectious disease can be proved. It is obvious that all healthy carriers must at some time or another have been in contact with the disease or with another carrier, so the distinction is only one of degree.

The question " Why should carriers arise at all ? " may well be asked. We know that the convalescent from an infectious disease acquires, by the formation of certain substances in his blood, an enhanced immunity or protection against future attacks of the disease. If he becomes a carrier, it would appear that the protective substances formed during his attack are not sufficiently powerful to bring about the complete disappearance

of all the germs from his body. In the case of the healthy carrier it has been proved that a certain degree of immunity also exists. Such an immunity may be a natural one or it may be acquired, the carrier in question apparently suffering from a mild or abortive attack of the disease with complete absence of symptoms.

The healthy carrier is therefore finally in a similar position to the convalescent carrier, in that, the antibodies in his system, which serve to protect him from an acute attack of the disease, are quite inadequate to bring about total destruction of the invading organisms.

An unhealthy condition of the tissues at the site where the germs are harboured, such as enlarged tonsils or a chronic inflammatory condition of the mucus membrane of the nose, also plays a considerable part in maintaining the carrier condition.

Carriers have been definitely proven as a source of infection in the enteric group of fevers, diphtheria, cerebro-spinal fever, dysentery and cholera. As I have already mentioned, it is safe to assume that carriers exist in relation to other of the infectious diseases: acute anterior polio-myelitis and scarlet fever appear to provide instances of carrier infection. Unfortunately the causal germ in many of the infectious diseases is yet undiscovered, and without this knowledge final proof of a carrier condition cannot result.

In this country carriers of diphtheria undoubtedly occupy first place as a source of public danger. There is, however, no uniformity of action in dealing with them: in certain districts routine swabbing of all diphtheria contacts is employed, and where this is done, especially during epidemic periods, the number of immediate contact carriers discovered may be considerable. These immediate contact carriers usually respond rapidly to treatment: a protective dose of serum; a course of antiseptic applications to the throat or nose, and complete disappearance of the organism, as a rule, quickly follows. Apart from any treatment, most of these cases would probably clear up spontaneously in a short time.

In those districts where the immediate contact carrier is dealt with, it is unfortunately the case that no marked reduction in the incidence of diphtheria has followed. I think, that perhaps the greatest benefit obtained from dealing promptly with this group is, that a certain number are actually "incubation carriers," and the treatment given aborts the onset of an acute attack of diphtheria.

The line of action to be followed in dealing with the "convalescent carrier" is a source of much controversy. In some places cases are discharged from hospital when perfectly well without any bacteriological examination of the throat or nose being made. Other authorities insist on one, two, or three negative swabs prior to discharge.

The arguments advanced against swabbing are (1) expense resulting from the retention in hospital of people who are perfectly fit, (2) the fact that the total carrier population is so large that the few discharged with germs in the throat or nose are a negligible percentage, (3) the fact that periods of intermission of infectivity undoubtedly occur in carriers and negative swabs may be obtained during such a period, (4) the fact that in swabbing a throat or the nasal passages it is quite impossible to cover the whole area. Where swabbing is carried out as a routine it must be granted that the actual numbers who have to be retained for any length of time are not very great, and a certain amount of satisfaction results from the knowledge, that a slightly lengthened stay in hospital has possibly reduced the number of positive throats and noses in the community. When the convalescent has become a true " carrier," however, and such a condition cannot be considered as existing until, say, at least three months have elapsed, little, if anything, is gained by further detention, as no certain means of clearing the carrier of his condition is known.

It is exceedingly difficult to form any idea of the actual number of diphtheria carriers that exist undetected. It is certainly considerable and a marked rise takes place during an epidemic period of the disease. Some little time ago in the United States an entire school of about 800 pupils (I am quoting from memory as I cannot at the moment lay hands on the article reporting the work), was swabbed on three occasions. The result of the three swabbings was, that about 160 of the pupils were found to be harbouring diphtheria germs in the throat: this, namely, twenty per cent., would appear to be an unusually high figure. A further example: at the Fever Hospital in Edinburgh, it is the custom to swab the throats of all patients admitted with Scarlet Fever; over a period of years from ten to fifteen per cent. of these patients were found to harbour the Diphtheria bacillus in the throat. It must be granted that the evidence was only microscopic; virulence tests were not carried out. Assume, however, that perhaps half of the total harboured the bacillus in a virulent condition, and one arrives at the result, that approximately five to seven per cent. of a chance group of people, and therefore possibly the same percentage of the entire population, were at least temporary, if not chronic carriers, of diphtheria.

If carrier infection during an outbreak is suspected, the nasal passages merit as much attention as the throat. I am convinced that the healthy nasal carrier is the greater source of danger: he disseminates virulent germs each time he sneezes; a mild nasal catarrh increases this danger, and he is much more likely, in a school or factory, to infect articles such as towels, that are used in common. Last year I had two very striking

instances of the damage a nasal carrier can produce. In one family, in addition to the nasal carrier, three cases of true diphtheria and two contact carriers resulted ; in another, two cases, of true diphtheria and three contact carriers occurred.

In either family the history given was similar : the proved nasal carrier had " had a slight cold in his head for some time past."

As to the question of treatment of the convalescent and healthy carrier in diphtheria, antiseptics innumerable have been employed without any success ; removal of tonsils, adenoids or nasal polypi, if such exist, must be done ; this, in a proportion of cases proves successful, but frequently fails ; living cultures of different germs have been sprayed on the throat, but have been found disappointing. The most promising treatment now available is the employment of a diphtheria vaccine, on the principle that the immunity of the person is thereby increased, and the possibility of complete elimination of the bacilli enhanced. The amount of reported work in this direction is not extensive, but the results so far to hand, where detoxicated vaccine has been employed, are sufficiently striking to justify further investigation. Detoxicated vaccine has the advantage that practically no reaction follows its use and enormous doses can therefore be employed. It is, however, an expensive preparation, and until very definite proof of its efficiency is forthcoming, it is not likely to be used generally in the meantime.

In New York the position in relation to treatment of diphtheria carriers is considered so unsatisfactory, that an attempt is being made to deal with the problem of diphtheria incidence by rendering the susceptible population immune.

The Schick test is employed first as a means of ascertaining the susceptibility or immunity of a person to diphtheria.

A positive reaction indicates susceptibility, and whenever obtained immunisation is carried out, by the use of a special preparation known as toxin-antitoxin mixture, which, when injected, stimulates the formation of protective substances in the body.

Davies, of Bristol, has reported favourably on this method when employed by him on a small scale during the recent epidemic in that city.

Treatment by rendering the population immune is yet in its infancy, but it appears to have a much more hopeful immediate future than attempting to reduce diphtheria incidence by the treatment of chronic carriers.

The carrier in Cerebro-spinal Fever harbours the organism in the mucus membrane of the naso-pharynx. The extent to which the general population may prove to be carriers cannot be easily determined, but it is definitely established that during epidemic periods the number of carriers becomes

relatively high : estimates give the figure as from two to five per cent. of the population in the epidemic area. As a rule most cases succeed in freeing themselves in a few weeks, and under appropriate antiseptic treatment the majority of the more resistant cases clear up in two to three months. The chronic carrier, however, still appears, and no satisfactory line of treatment has been evolved.

In dealing with the carrier of cerebro-spinal fever very great care is called for in obtaining swabs for examination.

Contamination is difficult to avoid ; the organism is an exceedingly delicate one, and, unless inoculation of culture media is carried out on the spot, death of the meningococcus may easily occur. Negative results are therefore not always of great value, and the satisfaction of having cleared a carrier of meningococci is often very doubtful.

The carrier in the Enteric Fevers provides a different type of problem ; the majority are certainly " convalescent carriers," but recent work indicates that the incubation carrier and contact carrier may play a part in the spread of these diseases.

The organisms are harboured in different situations :—

(1) The bile tract and particularly the gall bladder.

(2) The urinary tract and, where the carrier is a urinary one, lesions in the shape of small abscesses in the kidneys, or ulcers on the bladder wall are stated to be found.

(3) Deposits under the periosteum (the fibrous membrane covering bone). These deposits may remain inactive for years, but abscesses may finally form, and breaking down, provide a focus of infection.

These enteric carriers, particularly where the site is the gall-bladder, and the vast majority are of this type, may continue to be sources of infection for years, virulent bacilli, in enormous numbers, being passed with the stools or urine. Dean, in 1908, recorded a case in a patient, who, twenty-nine years after her attack of typhoid fever was found to be still passing virulent germs in her stools.

Enteric carriers, more than others, present the phenomenon of being only intermittently infectious. One is therefore in the position of being quite unable ever to declare with any degree of confidence, that an enteric carrier is cured.

Treatment is at a discount ; some drugs, notably urotropin, are stated to be of assistance in the urinary carrier, but this is exceedingly doubtful ; cure of the abscesses in the periosteal type removes the focus of infection ; where the organisms are harboured in the gall-bladder the position is one of exceeding difficulty. Intestinal antiseptics and vaccines have been tried without any success. Excision of the gall-bladder has been claimed as a

means of cure; it is, however, hardly conceivable that all proven enteric carriers would be in the least willing to consent to this somewhat drastic treatment.

Modern sanitation is our biggest asset in protecting us from the danger of these enteric carriers, and accompanying this there must be careful control over water and milk supplies, and of the collection and sale of shell-fish. The known carrier must never be allowed to handle or to assist in the preparation of food or drink for human use, and careful attention to excretal and self-disinfection must be insisted on.

But for every known carrier how many unknown exist? Simon, of New York, estimated in 1915, that the enteric carriers in that city numbered roughly 25,000.

Carriers of cholera and dysentery are only of passing interest to us in this country. It would appear that the number in cholera is not proportionately very high, and the carrier condition is said not to last any length of time. The carrier in dysentery is, however, a fruitful source of danger, and may continue to be so for lengthy periods; the condition here, to some degree, arises from the fact that there is a great tendency to chronicity in the disease (particularly in the amœbic variety), and the person becomes actively infectious whenever a mild recrudescence occurs.

Permit me now to review the situation. I have shown that the carrier is not an oddity; on the contrary he probably is, and certainly becomes during epidemic periods of some diseases, quite an appreciable percentage of the population. His discovery, unless he happens to be a member of a small community, such as a family, may prove a matter of extreme difficulty and entail much expense.

Treatment of the really chronic carrier has so far proved eminently unsatisfactory, and a claim to cure may prove later to have been only co-incident with a period of intermission in infectivity.

If isolation of all chronic carriers were to be insisted on until apparent cure had resulted, some cases, notably certain enteric carriers, might easily become inmates of an isolation hospital for life. Even convalescent diphtheria carriers have been proved to continue as such for several years.

The healthy carrier in diphtheria and cerebro-spinal fever cannot be considered to be suffering from an infectious disease, and such being the case one has no legal power compelling his isolation. Where isolation and treatment of discovered healthy contact carriers is indulged in, it is rare to find a direct refusal to comply with the request. If such refusal were met with, however, one could do nothing more than point out to the carrier the danger he is to the general public, and instruct him as to precautions he should take to avoid spreading infection; such instructions directing

him to abstain from the use in common of eating and drinking vessels, and to refrain from kissing. But when all is said and done, the known direct contact carrier of diphtheria and cerebro-spinal fever is but a trifling percentage of the undetected ones. When a satisfactory treatment for this group of carriers is discovered, then legislation could be obtained enforcing submission to it. Enormous expense would be involved in discovering the carrier population, but it would certainly be justified, if one could succeed thereby in stamping out, or even appreciably reducing, the incidence of such a scourge as diphtheria ; meantime, I consider that immunisation with toxin-antitoxin mixture promises the most hopeful outlook in reducing diphtheria incidence, and one awaits with great interest further reports as to its efficiency.

The Pneumonia, Malaria and Dysentery Regulations of 1919, are the sole piece of legislation in regard to carriers. By them, powers are granted prohibiting dysentery and enteric carriers from taking part in food preparation, and entailing on the carrier in question obedience to orders from the Local Authority as to disposal of excreta and precautions as to self-disinfection. Meagre enough these powers are, and difficult to enforce satisfactorily.

In Typhoid, Cholera and Dysentery, protective inoculation has proved its worth, and, if anything approaching a large epidemic of one of these diseases should ever threaten, this would of necessity be our chief means of guarding ourselves against it and the crop of carriers arising from it.

I have confined my remarks to the human carrier ; we must remember, however, that animal carriers of disease are comparatively common. The ordinary house-fly is a carrier of particular danger in typhoid, cholera, dysentery and summer diarrhœa in children. Different varieties of the mosquito in malaria and yellow fever, the tse-tse fly in sleeping sickness, fleas in plague, lice in typhus and relapsing fever, and the goat in Malta Fever.

Of the animal carriers, the house-fly alone is of particular national importance to us, and we can all assist in his destruction, and help thereby to reduce the heavy yearly loss of infant life caused by summer diarrhœa.

The Norwich Flood, 1912.

By Captain Henry Wood, late R.E., A.M.Inst.C.E., Deputy City Engineer, Norwich.

Read at Norwich Sessional Meeting, February 17th, 1922.

(Abstract.)

On August 26th, 1912, after an exceptionally wet season, a record rainstorm burst over Norfolk during which, in portions of the watershed, six inches of rain fell in 11¼ hours. The centre of the rainstorm was at Brundall, some 6 miles east of Norwich, where a rainfall of 8·09 inches fell in 29 hours, and at Hanworth, 8·27 inches fell in 24 hours.

Over an area of 2,044 square miles in Norfolk, according to Dr. H. R. Mill, a mean rainfall of 5·08 inches fell, corresponding to 150,000,000,000 gallons or a total weight of 671,000,000 tons.

With regard to the amount of water carried by the river a calculation had been made which showed that the River Yare at Yarmouth drains an area of about 1,200 square miles, from which the total volume of water was 102,700,000,000 gallons, which weighed 458,700,000 tons, and the Yare and Wensum above their junction at Trowse Hythe carried almost exactly one third of this amount.

The Yare below the junction of the Wensum and including the Waveney, also carried one third, and the Bure also carried almost exactly one third of the quantity of rain.

The area of highest rainfall lay between Norwich and Yarmouth over the region of the Broads, and the rivers above Norwich were all the time flowing from a region where the rainfall was smaller towards one where it was higher, and shortly afterwards a record ebb tide was experienced at Yarmouth, thus facilitating the passing water to the sea at an important stage of the period of excessive rainfall. Had the area of most intense rainfall been shifted a few miles westward, the severity of the floods at Norwich must have been very much greater.

From investigations furnished to the British Rainfall Association since the year 1865 there are only two previous occasions on which as much as 1,000 square miles had unintermittent rainfall of over 4 inches, and these were the rainfall of October 26th-28th, 1909, in the South East of England when there were 1,000 square miles with more than 4 inches of rain, and the storm in the east of Ireland on August 24th-26th, 1905, when there were 1,160 square miles with more than 4 inches of rain.

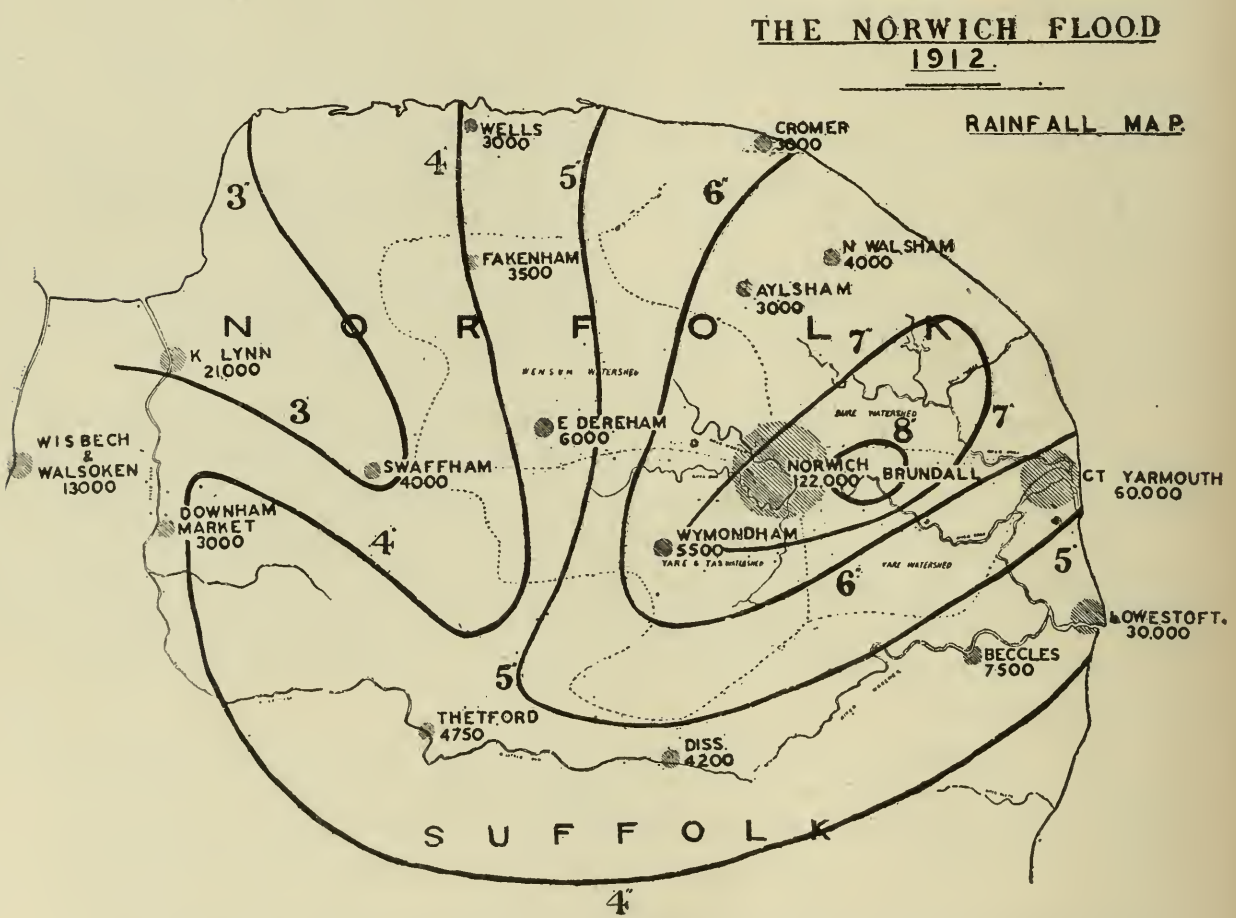
But in East Anglia on August 25th-26th, 1912, there were 1,940 square miles over which more than 4 inches of rain fell.

The fall was thus nearly twice as extensive as any previous recorded fall of the kind in the British Isles.

The wettest two months previously were July, 1875, and November, 1878, in fact there are only two occasions on record on which a heavier fall of rain in the 24 hours has been recorded. At Ben Nevis on February 6th, 1904, 7·74 inches were recorded, and at Seathwaite on the 12th November, 1897, 8·03 inches.

It should be remembered, however, that the yearly average rainfall at Seathwaite is 135 inches, and at Brundall, near Norwich, less than 25.

At Norwich the rain began to fall at three o'clock in the morning of 26th August, and continued for 29 hours without ceasing. It was accompanied by a blizzard which added much to the destructiveness of the rain.



The large figures give the inches of rainfall, and the black lines indicate the area to which each inch of rainfall applies.

As a direct result of the violence of the rainstorm all railway traffic, both goods and passenger, was stopped and Norwich was totally isolated from the remainder of the country. The tramway service was dislocated and all telegraphic services rendered useless.

The first flooding in Norwich was not due to the river but to the vast quantity of surface water coming from the uplands bringing debris and silt which blocked the gullies and thus prevented the sewers and drains from dealing with the abnormal conditions.

As expeditiously as possible obstructions were removed, and assisted by the opening of manholes and gullies, the streets soon became clear and the waters in the City were speedily disposed of.

At 9 o'clock in the evening, however, the volume of water passing along the valley of the Yare, being the western boundary of Norwich, became so great that at Lakenham two brick bridges were washed away. Before one o'clock of the following morning one of the stone bridges at Trowse collapsed, whilst another was rendered dangerous by cracks in the structure.

Comparatively little damage was done by these collapses and the partial damming of the river. This was owing to the fact that the waters had ample scope for spreading over the low-lying lands in the neighbourhood of these bridges, which districts fortunately are sparsely populated.

In regard to the River Wensum which passes through the centre of the City, the sluices at New Mills were opened in advance of the flood to reduce flooding, and it was no doubt owing to this action that the rising of the River Wensum above New Mills was delayed.

The full effect of the rainstorm was soon felt. On the 26th the River Wensum kept fairly within its boundaries, but on the Tuesday the river, fed by the drainage from the watershed of some 290 square miles, rapidly overflowed, causing destruction far and wide. By shortly after three o'clock in the afternoon the water had risen above the high water mark of the record flood of 1878, and streets in the neighbourhood of the river were impassable.

On the 27th, in anticipation of the flooding, orders were sent to all school caretakers to be in readiness to receive persons from flooded areas.

Arrangements were made for supplies of mattresses, blankets, and food. By 6 p.m. a contingent of Corporation carts were on patrol duty in each flooded district, equipped with ladders for the removal of persons from flooded houses. The scenes as darkness fell in the flooded districts beggar description. Literally darkness fell, for there were no street lights, as the Gas and Electricity Works had been flooded. The streets bore turbulent torrents of varying depths and velocities and down every court, yard and passage imprisoned people were eagerly awaiting the advent of rescue.

Down yard after yard, often with water up to the floorboards of the carts, the rescuers went, and women and children were removed from the upper windows by the aid of ladders. Load after load of children, many of whom had to be taken off in boats from houses, were brought to the nearest shelter, where fires had been lighted and arrangements made for their comfort. Later the flooded streets were patrolled by police in boats.

Factories, breweries and works adjacent to the river were flooded, and the rising water penetrated to the Norwich Electric Light Works, the British Gas Light Co.'s Works, and the Waterworks. Pumps were operated and every effort made to keep down the water, but as the river level continued to rise the whole of the machinery in the Electric Light Works had to be stopped, and no electric lighting was available in the City.

There was so much water in many of the main streets that at 7.30 p.m. the trams ceased running.

The river continued to rise all Tuesday night, and, as was expected, North Heigham district suffered terribly. The ever-swelling river overflowed its banks with such velocity and in such volumes that it was impossible to navigate a boat against the current. The streets became rivers, ranging in depth from 5 to 10 feet. Thousands of people were rendered homeless and those in their homes were driven upstairs and rescued through the windows. During the whole of this memorable Tuesday families were taken out of their flooded homes and transferred to various churches and schools.

The continually rising level of the river necessitated the stoppage of traffic over St. Miles Bridge, as the waters had risen above the top of the underside of the bridge. The velocity of the torrent through the bridge increased.

The waters steadily rose during the whole of the 27th, flooding further streets and washing down substantial buildings and bridges. At one o'clock on Wednesday with the river level still rising, communication between the two sides of the City became impossible. The flood rose to its maximum during Wednesday afternoon.

The flood showed signs of abatement on the Wednesday afternoon and, as the day progressed, subsided rapidly. Rescue work had proceeded throughout Tuesday night. I very well recollect the dawn on this Wednesday morning. The sun shone and the sky was like burnished silver. The streets were thronged with wearied watchers. Trollies were busily carrying provisions to the various rescue centres.

On the Thursday the flood continued to subside rapidly, and the majority of the previously inundated districts were practically clear of water. Active steps were taken to make good damage and very many buildings were temporarily shored up.

The extent of the area flooded within the boundary of the County of the City of Norwich was 750 acres. The number of buildings affected was 3,650, of which 33 were places of worship, schools and 59 factories. The population in the flooded area numbered 15,300.

In addition to the maintenance of persons removed to shelters, it was found necessary to distribute bread, corned beef, cheese, biscuits, milk, water, matches and candles, to the persons imprisoned in houses in the flooded area.

The number of houses to which food was supplied from St. Andrew's Hall was 2,405, representing 4,297 adults and 4,320 children, or 8,617 persons in all. The average number of persons fed from St. Andrew's Hall per day was approximately 7,000.

In order to meet urgent need clothes were supplied to the shelters from City stores in addition to those sent there directly by donors.

The general health of the people in the flooded area remained remarkably good and the fear of an outbreak of epidemic diseases was not realised.

Geographical Features.—The present river valleys where now occupied by marshes were formerly estuaries and possessed three different outlets to the sea, which allowed of a much greater tidal range than at the present time.

A freshet such as that of August, 1912, would make no appreciable difference to the water-level in these estuaries, being relatively small in bulk as compared with the tidal displacement.

It would, however, transport materials from the uplands to the estuaries where the materials would be deposited and in course of time decrease the water ways with consequent diminution of the tidal displacement and reduction of scour, and in addition this process would be aided by building river banks, known locally as river walls, and draining the area thus enclosed.

Previous Floods.—There have been 37 floods recorded in Norwich between 1271 and 1912, or an average of one about every 17½ years, the 1912 flood was 12 inches higher than the previous highest flood in 1570.

Flood Levels.—1614—15 ft. 6½ ins. above mean H.W.; 1646—15 ft. 3 ins.; 1734—13 ft. 10½ ins.; 1762—14 ft. 6½ ins.; 1770—14 ft. 3½ ins.; 1878—13 ft. 8 ins.; 1912—16 ft. 6½ ins.

Flood Reduction Works.—The City Engineer, Mr. Arthur Elliston Collins, prepared a report on flood prevention works in which he recommended the widening of the river channel through the City to a minimum of 80 feet and below Trowse Hythe 90 feet, increasing gradually down stream; the deepening of the channel to a minimum of 10 feet below mean water level between New Mills and Foundry Bridge, and 15 feet below Foundry Bridge.

The extremely sharp bends in the river between Norwich and Great Yarmouth require to be eased, and in many places new cuts would greatly improve the discharging capacity of the channel.

At the present moment the junction of the Waveney and the Yare just below Berney Arms is of a very bad shape and the line of the suggested cut would greatly improve it.

It is not feasible or desirable to widen the river mouth as this would allow too free an entrance for the tides and so cause flooding of thousands of acres of marshes and endanger Great Yarmouth.

The various improvements suggested would be to reduce the level of a flood due to the identical conditions which obtained in 1912 byabout 5 ft. 3 ins. at New Mills downstream, and nearly 1 ft. at Trowse Hythe.

The reduction at Trowse Hythe might appear small, but the river with improvements as suggested would be actually discharging the flood water, whereas in the flood of 1912 a great part was being held up and stored on the marshes.

Flooding and Slum Property.—As a direct consequence of the flood of 1912 the Norwich Town Council has carried out the Norwich (Rayners Yard) Area Improvements Scheme, 1913, under the Housing of the Working Classes Act, 1890 and 1899.

The property consisted of 7 badly congested courts and yards enclosing 149 houses, with a population of something over 300 persons.

The majority of the houses were back to back without any through ventilation, and were generally very dilapidated and decayed.

The greater portion of this property has now been pulled down and the site utilised for the erection of a boot and shoe factory.

After the Great War the Corporation prepared a town planning scheme, part of which has been the purchasing of four large estates in the outlying portions of the City. One of these Estates has been completed with the erection of 144 houses, another Estate is well in hand with the building of 160 houses. It was desired to erect immediately 1,200 houses to meet requirements, but the changed policy of the Government stopped the work. All these Estates have been planned under the guidance of Professor Adshead (Consulting Architect), and Mr. Arthur Elliston Collins, City Engineer. The lay-out, sewers, roads and buildings are being executed by direct labour.

Limitations of Bacteriology in its Application to Public Health.

By J. W. McLeod, O.B.E., M.B., Lecturer in Bacteriology, University of Leeds.

Read at Leeds Sessional Meeting, February 24th, 1922.

IT is not, of course, my intention to deal with the more obvious limitations of bacteriology in its application to public health, nor to call in question the high value of many bacteriological procedures, such as the Wassermann Reaction, the serum diagnosis of typhoid fever, and the demonstration of typhoid bacilli in blood, urine and fæces. What I would, however, emphasise is that a number of bacteriological procedures have been generally adopted, or, at all events, widely adopted for the diagnosis of infectious diseases which are not altogether adequate to the end for which they are adopted. I shall give three instances of what I mean, the present state of the bacteriological diagnosis of diphtheria, cerebro-spinal meningitis and influenza.

When you have admitted that the bacteriological diagnosis of diphtheria is accurate enough to be distinctly useful you have said all that can be said. What are the weak points of the methods used ?

Let us take, first of all, the case of the throat swab, and suppose that you are examining a diphtheria convalescent for persistence of infection or a suspected carrier. Then what will happen time and again is that instead of the characteristic film looking like a pure culture of K.L.B. you will get a film in which, amongst other bacteria, are considerable numbers of Hoffmann's pseudo-diphtheria bacilli, and amongst these again a few forms with granular staining. The problem which presents itself is : Are you dealing with a few Hoffmann's bacilli which are showing granular staining, or have you a culture consisting of a large number of Hoffmann's colonies and a few K.L.B. colonies. If you had made your film from a single colony and got the appearance described you would decide without hesitation that this appearance depended on the presence of few Hoffmann's bacilli which showed granular staining, and that the case could be reported as negative. The first improvement in technique required, therefore, is the plating out of swabs instead of their inoculation to tubes in order that the examination of individual colonies may be readily accomplished. The practical difficulty in effecting such an improvement is that Loffler's medium is a very awkward

one to handle in plates, and that the increased labour involved in medium preparation, etc., would be a drawback. Unfortunately, there is no other medium in common use which has quite the same power of enabling K.L.B. to overgrow other bacilli as Loffler's.

A further difficulty and weakness in our present technique is our inability to demonstrate the presence of K.L.B. in the throat when they are there in very small numbers. What is required for this purpose is a fluid medium which will favour the growth of K.L.B., while restraining that of other bacilli. No such medium has as yet been devised. The advance which is, therefore, required at this point is a better knowledge of the qualities which make Loffler's medium so valuable for the growth of K.L.B. and some method of incorporating them in a medium which can be more conveniently used in plates.*

But, to take next the examination of the nose, ear, etc., for diphtheria bacilli. Here we are met with a fresh difficulty ; in these areas diphtheroid bacilli are commonly present which are in their morphology much less readily distinguishable from K.L.B. than is Hoffmann's bacillus. In such examinations, therefore, even granting that you have got a suitable medium for colony separation, the further question arises whether you can differentiate K.L.B. from other diphtheroids, morphologically similar by the appearance of its colonies.

I am not prepared to answer this question with much confidence, but I am inclined to think that you cannot.

My reason for thinking so is that at least two distinct strains of bacilli morphologically K.L.B. and toxic in animal experiment can be demonstrated ; the one with a convex raised and slightly opaque colony ; the other with a smaller flattened colony, which shows a pattern suggestive of mosaic. The position, therefore in examining the nasal swabs of contacts is that a number of cases may be met with in which a positive or negative report cannot reasonably be rendered without recourse to the determination of the toxicity of the bacteria in suspected colonies by animal experiment. That is to say, that at least 5 to 7 days must elapse between the receipt of a swab and the rendering of the report ; that is, if the report is to go out with the honest conviction of the bacteriologist behind it. Such delays must undoubtedly gravely increase the already considerable difficulties of isolation of contacts during examination, and so tend to diminish the value of the whole procedure.

Fortunately, there appears to be a good prospect that with the use of the Schick Reaction to determine who are the susceptible individuals in a

* The medium recently introduced by Dr. Smith, of Glasgow, which consists of agar containing 5 per cent. of sheep's serum and 1 per cent. of telluric acid, is probably an advance on our present methods, but it has not yet, so far as I know, been subjected to the criticism of trial on a large scale

community and by the active immunisation of these with toxi-antitoxin mixtures a very desirable short cut through all these difficulties of determining and segregating infected contacts has been found.

If we now turn to epidemic cerebro-spinal meningitis we find that a different set of conditions exists. Here the area of the body liable to invasion is normally free from bacteria, and therefore any type of bacterium invading this area and resembling in morphology and cultural appearance the recognised cause of this disease, *i.e.*, the meningococcus, can be described without hesitation as a meningococcus ; if it does not exactly conform to the types already described it will be designated a new type.

Up to this point the bacteriological diagnosis in cerebro-spinal meningitis is straightforward. When, however, you come to the problem of picking out carriers of potentially infective meningococci by examination of swabs of the naso-pharynx the matter is a very different one.

A perusal of the various memoranda issued during the war on the subject of bacteriological methods for identifying carriers of infective meningococci leaves one with the impression that there are many cases in which neither the morphology nor the cultural appearance of a bacterium enables one to distinguish between a meningococcus capable of invading the meninges and a saprophytic diplococcus which is never likely to do so. It is for this reason that it is recommended that the identification should be completed by determining agglutination and sugar reactions.*

What a thorough examination, therefore, means is that all the colonies you may wish to test are sub-cultured at once to a suitable medium for preservation, and these tested in rotation or simultaneously on sugars. In other words, the thorough examination of a group of 30 men for the detection of carriers of cerebro-spinal meningitis among these might mean the preparation of some 3,000 cultures if all contacts are examined on three successive occasions, apart from any agglutination work. Suppose, then, a laboratory required to examine fresh batches of contacts every day, which was the actuality from time to time, I am convinced that the adequate staff for such a laboratory is 12 bacteriologists and 30 or 40 assistants. The provision of laboratory staff, which exists in most places actually, is 1 to 3 bacteriologists and 2 to 6 assistants. What all this amounts to is that the country cannot possibly afford to examine the community for carriers of the meningococcus until we have other and better methods at our disposal for distinguishing between pathogenic bacteria and closely allied species.

To come last to the question of influenza, I will not attempt to treat this subject in detail, but shall try to point out what seems to me to be the

* Here Dr. McLeod explained and set out upon a blackboard the particulars of the large amount of work required in a thorough examination of cerebro-spinal contacts.

chief difficulty in the bacteriological examination of this disease. Suppose that we waive altogether the controversy as to whether or not Pfeiffer's bacillus is the cause in influenza, and settle on the simpler problem as to whether Pfeiffer's bacillus is or is not present in influenza ; it will then be found that there remains the very real problem as to what is Pfeiffer's bacillus. There seems to be every probability that there exists a large group of " Pfeiffe-roid " bacilli with pathogenic and non-pathogenic members just as there is a streptococcal group, a diphtheroid group, and a group of Gram negative diplococci. What, however, we do lack, is any adequate criterion for differentiating amongst the members of this group of Pfeiffer-like bacilli. Till we possess such criteria the practical application of bacteriology to influenza is likely to be limited.

The general conclusions which I should like to draw are, first, that a large degree of individual freedom in bacteriological work is desirable ; no method that is really good will fail to make its way, and a good deal of waste of time and personnel is likely to result from imposing methods which have been insufficiently tried ; second, that no public body can expect to get efficient bacteriological service unless it provides a personnel more than ample for its routine work. Good routine work will only be done where the worker has time at his disposal for experimental assessment of the value of his routine procedures.

Lastly, research is still quite as great a part of the field in bacteriology as the application of knowledge already acquired. We may not be as rich a country as America, but we certainly are, even at this moment, spending huge sums on all kinds of luxuries, and it surely would become us at least to give medical research a place of honour amongst our luxuries.

Hospital Management and Treatment of Infectious Diseases.

By A. E. Pearson, L.R.C.P., M.R.C.S., Medical Superintendent, Seacroft Infectious Diseases Hospital.

Read at Leeds Sessional Meeting, February 24th, 1922.

IN a hospital of the size of the one at Seacroft there are many and diverse problems, involving much responsibility and anxiety for the Administrator. For, apart from purely medical, surgical and bacteriological work, the range of duties is extensive and various.

Of great concern are Financial matters, as they are to the Committee and Council. The annual expenditure was large before the War; during and since the war, the cost on revenue account has become almost prohibitive. The cost is largely accentuated by the wide distances between the buildings comprising the hospital, distances varying from 80 to 200 feet. (Dr. Thorne-Thorne's allowable distance in his Memorandum was 40 feet). These buildings, 61 of them, have to be reached by, and linked up with, hot water pipes from the central system for hot water and heating, by gas and cold water pipes, by electric cables and wires, and by corridors, subways, roads and drains. Repairs and replacements to this extensively wide system are considerable and costly, and necessitate, by the wide divergence of the constituent units of the hospital, the employment of a large staff of workers. My advice to those projecting hospital schemes is, for economical working, to lessen the distances adopted at Seacroft.

To further understand the size of the hospitals at Seacroft I give the following particulars :—8 miles of drains, 26 miles of gas, water and steam pipes, 46½ miles of electric wires, 98,000 square feet of glass, 4½ miles of eaves spouting, 1¼ mile of cart roads, 1½ miles of covered corridors with subways 4 feet high.

Having in mind these details, one can understand the large cost in working.

On Accommodation.

There are 500 beds at the Seacroft Hospital, each having 2,000 cubic feet, of which there are 70 for the isolation of doubtful cases and of mixed infection.

In a general way the diseases dealt with are those scheduled in the Infectious Diseases (Notification) Act. Diseases not scheduled as measles, chicken-pox, whooping cough and others, are only taken to hospital when accommodation allows of them being taken with safety to themselves and the patients in the hospital. My view is that fever hospitals should not be

overcrowded. An effort, I think, should be made to home treat certain infectious cases when the hospital has been filled to a certain extent. Especially, I think, home treatment should be carried out in the larger houses in which separate accommodation could be provided. This would allow of necessitous cases coming into hospital.

Fairly frequently cases are sent in with other infectious diseases running concurrently. To prevent foreign or mixed infectious conditions spreading to others is a somewhat difficult matter and one of great concern to the management. The incidence of these causes annoyance and distress to patients' friends, and tends to prolong the period of isolation. At Seacroft, as in other fever hospitals, means of isolating these, I consider insufficient, and in my opinion, 50 per cent. of the available accommodation in a fever hospital should consist of single or 2-bed isolation rooms, *e.g.*, large wards on the cubicle system. The "barrier" system in theory is excellent. In some hospitals the "barrier" arrangements are elaborate; but with a constantly changing staff the system may, I think, fail, owing to lack of knowledge or care of the Nurse. Education of nurses in fever hospitals is most important, not only in aseptic methods of treatment, but in diagnosis and treatment. A careful well trained nurse is a great help. Much has been done in this direction by the Fever Nurses' Association.

There are 15 large pavilions at Seacroft taking 30 patients each, these again being divided into two wards of 15. In these the patients are classified as to degree of sepsis, proceeding as they lose their acute and septic states to semi-acute and convalescent wards. This classification I regard as very important. The arrangement tends to prevent the supervention of added disturbances from contact with persons or things having more virulent or malignant micro-organisms and with patients with concurrent infections. For cases supposed to be of the same disease are not always alike from a bacteriological standpoint, though supposed to be.

On Prophylaxis.

Prophylactic measures are most important. The members of the staff and the patients must be protected, so far as is possible, from disease. Much has been done with satisfactory results; much remains to be done. The time possibly may come when members of a fever hospital staff will be expected to possess, by vaccination, specific receptors, agglutinins or other antibodies for every known infectious disease. There occurs to me to be one problem to be considered in connection with vaccines for prophylaxis, and that is the probable average length of time, which has not yet been defined, that immunity lasts, and the question of re-vaccination

In the case of typhoid fever it has been my practice for some years to vaccinate members of the staff engaged in attending to the typhoid sick

against the disease, the result being that, during this period, there has not been one case of typhoid among the staff, though we are rarely quite without typhoid patients. Formerly and in the earlier years of my hospital work, there had been a fair number of attacks amongst the staff, with, unfortunately, fatal consequences in some. To satisfactorily and apparently perfectly protect against typhoid has been a great relief to my mind. In carrying out typhoid prophylaxis it is important that injections be continued if necessary beyond the usual two and till the individual's serum produces a fairly quick agglutination test.

Take another disease, influenza. You are all aware of the present outbreak and of the terrible pandemic of the year 1918. In that year at the hospital we lost 12 members of our staff of 80 attacked. No treatment, vaccine or otherwise, availed to mitigate its malignancy. During, and in the earlier part of, the present outbreak, which had been preceded by three serious cases in the staff, I have caused some 120 of the members of the hospital staff to be vaccinated with the Ministry of Health's anti-influenza vaccine. Of this number three only have developed influenzal symptoms, two of mild and one of moderate severity. All have recovered without secondary complications. This is in marked contrast in the incidence amongst the patients, in whom the attacks have been comparatively frequent, though of somewhat mild kind. The incidence amongst our staff compares very favourably with that of other hospitals I know of, in which anti-influenza vaccine has not been used, and in which deaths from the disease have occurred. Some vaccines probably do not affect, to any great extent, the primary toxic disturbance, but they do, in my opinion, modify, or prevent, the secondary, often septicæmic, disturbances, which are so much to be feared in infectious diseases generally. I can confidently commend the use of anti-influenza vaccine in all institutions. Incidentally, I would ask the question, " What are the causes of influenza and its rapid spread ? " The cases I have come across in hospital do not seem to arise from personal contact, the cases springing up in wards far apart. One must look, at least, to some extent, for meteorological conditions, which, even now, are not thoroughly understood in relation to the causation of infectious diseases.

Now let us consider what prophylactic measures can be adopted in diphtheria. To some extent satisfactory, present means for prophylaxis, are not entirely so. For in spite of protecting gauze masks, and antiseptic throat applications, nurses get diphtheria, and there have been several deaths. To prophylact attendants with antitoxin, small doses, say 500 units, might be used, but its influence is temporary and immunity soon passes away. To continue these prophylactic injections, say every two

months, unpleasant, if not serious, anaphylactic disturbances, might arise. For some years it has been my practice to temporarily immunize scarlet fever and measles patients of susceptible ages against diphtheria, with more or less complete success by giving small doses of antitoxic serum. I have done the same for orphanages, schools and others, in which diphtheria has occurred, with success, the members of which have been sent up to the quarantine station for disinfection and observation. I have not found serum sickness, except in very few cases, or anaphylactic symptoms arise, and I have in this way practically eliminated the occurrence of diphtheria in the scarlet fever wards. Before adopting this method, diphtheria attacks would occasionally arise in the fever wards. You are aware, no doubt, that recently a report on diphtheria has been presented to the Ministry of Health by Dr. Copeman, in which prophylaxis is advocated by a toxin-antitoxin preparation in conjunction with the Schick test of susceptibility. I am pursuing this latter test at the present time in the diphtheria wards, but as yet have not had sufficient experience of it to form an opinion as to its positive value and am about to test the value of prophylactic injections of toxin-antitoxin on those of the nursing staff who are willing to submit to the operation. I have no data on which to base an opinion of its immunising effect : it seems to me, however, that it may be of great value in producing a longer period of immunity than antitoxin alone. It is said to give a five years' immunity, but it seems, as in vaccination against small-pox, reactionary disturbances may supervene. This may prove a troublesome factor in its application. In effect, the proposition would be to induce the production in the human body of specific receptors anticipatory to a diphtheria attack, rather than as in antitoxic serum introduce receptors already made from an animal immunised exactly in the same way, with possibly better and longer immunity.

There is yet another infectious disease very prevalent and occupying much of the accommodation in fever hospitals. Can we provide defensive measures against Scarlatinal attack ? The usual method, and the only one practised, so far as I know, is to endeavour to antisepticise the fauces by local antiseptic applications. I am inclined to believe that a mixed streptococcic vaccine now used for treatment, might be used for prophylaxis purposes, much in the same way as a typhoid vaccine is used. I have no experience of its use in this direction.

On Diagnosis.

A correct diagnosis in infectious diseases is not always an easy matter, and a considerable number of mistakes are made when cases are sent into hospital. It is often a difficult matter to place these patients so as to ensure safety to themselves and to other patients. The comparatively frequent

occurrence of these cases accentuates my plea for more single-room isolation. Though there are known to be simple bacteriological tests, which could be applied before admission of the patient, these are not often resorted to. There is too great a tendency to rely on one clinical sign in arriving at a diagnosis. For instance, a scarlet rash for scarlet fever, throat exudations for diphtheria, diarrhœa and dry tongue for typhoid, and so on : concomitant signs and symptoms being disregarded, a wrong diagnosis is fairly often arrived at.

A word or two about bacteriological tests. These may lead one astray occasionally. In diphtheria, for instance, a negative bacteriological test does not necessarily negative a diagnosis of diphtheria, and one should take into account the many non-acid producing non-pathogenic pseudo-bacilli occasionally found, and there also seems to be a tendency to come to a bacteriological diagnosis on morphological appearances alone. For instance, take the bacillus auris found so often in the ear discharges of scarlet fever, the xerosis bacillus and so on. Again I do not regard a negative agglutination blood test for typhoid conclusive proof of absent typhoid. This is a test of resistance and fairly often I have found agglutination absent in very severe typhoids, quite positive by clinical signs. Direct blood cultures in septicæmia is, in my opinion, the surest bacteriological test. In scarlet fever a diagnostic sign, advanced by Dr. Meredith Young, in an article in the *Practitioner*, might be used, *i.e.*, the production of petechial patches by pinching the skin, after producing dilatation of venous vessels of the limb by a bandage.

Measles and scarlet fever, measles and diphtheria, measles and small-pox, measles and typhus, chicken-pox and small-pox, and others having points of similarity, have often been mistaken for one another and have given rise to much anxiety to the administrative mind.

On Incidence of Complications, Treatment and Mortality.

Scarlet fever admissions which have averaged about 1,000 cases annually for a number of years, have not shewn a marked increase or decrease, except during the years 1916, 1917 and 1918, when the average fell to 588, the cause of the decrease not being apparent.

The death-rate of scarlet fever, which was 5·6 per cent. in the first quinquennial period of my time in the fever hospitals (1891 to 1895), has since fallen gradually to 1·6 per cent. in the last quinquennial period, 1916 to 1920 ; the death-rate for 1920 was ·8 per cent., and for the current year up to date ·8 per cent. for 1,210 patients whose treatment was completed. On these figures, it would appear that some 50 to 100 patients escape death every five years as compared with the earlier periods. or

about 15 fewer deaths each year. But it has been stated to me that, though the death-rate is much lower, damage to the constitution left by the disease may be greater. I don't find this to be the case, as I think you will agree on the following figures. Complications, and consequent damage, temporary and permanent, have fallen correspondingly. I have taken rheumatism, heart murmurs, otitis media, rhinitis and albuminuria as expressions of sepsis, virulence and damage :—

	1892-1912 (20 years).	1920.	1921-22. Nov. to Jan.
Rheumatism ...	2·5	2·1	3·3
Endocarditis ...	1·3	1·7	1
Otitis Media ...	11·4	6·5	6
Mastoid disease ...	·7	·2	·6
Rhinitis	9·3	9·	7·3
Albuminuria ...	9·1	4·3	3·9
Uræmia	·2	·1	Nil.
Meningitis... ...	·4	Nil.	Nil.
Death Rate ...	3·1	·9	·6
Relapse rate ...	2·	2·5	2·4

Against the popular view, true relapses do occur in scarlet fever, either from auto-infection, or from segregation with other cases, especially during the period of maximum prevalence of the disease. I think one may regard albuminuria as a qualitative expression of toxæmia in all bacterial diseases. And again, in earlier years, we used to have 3 or 4 severely hypertoxic malignant cases every year with early fatal results : these are now very rarely seen.

As in the seasonal incidence of number of cases, so, in the incidence of complications in scarlet fever, one should, I think, closely follow meteorological conditions. Following the annual increased prevalence in October, November and December, one finds that the incidence and severity of complications and the tendency to the fatal results increases gradually to February. After this month, from March, a steady decrease in these takes place to August. In my view (apart from reasons of segregation of persons in the winter months), absence of sunshine, increased humidity (especially observed after a very hot summer), and gradually increasing low temperatures (mean temperatures and earth temperatures) by decreasing body resistance, are important factors in determining incidence and severity, of not only scarlet fever, but all septic diseases, as say, erysipelas, puerperal fever, and septic cases of diphtheria. An extraordinary wave of sepsis seems to be present during the present month in the increase of complications. Taking 242 scarlet cases now in hospital :—

Albuminuria	...	...	from 4·3%	in 1920 to	5·0%
Rheumatism	...	...	,, 2·1%	,,	4·5%
Otitis media	...	...	,, 6·5%	,,	10·4%
Rhinitis...	...	...	,, 9·0%	,,	11·2%
"Return" case rate	...		,, 2·5%	,,	8·0%

Relapses have been also more than ordinarily frequent, and this percentage is likely to be increased before discharge of the patients.

The chief cause of death in scarlet fever is a secondary septicæmic fever following on the primary specific toxic fever, which occurs in patients, most of them under 5 years of age. In treatment, by the use of a mixed streptoccic vaccine, adopted by me during the last three years, I am fairly certain that this secondary blood-infection has been largely prevented, a mitigated recovery usually ensuing, whereas formerly many of this class of patient died, on or about the 14th day of disease. The ideal treatment of scarlet fever, I think, when it can be put into practical working, will be vaccination by autogenous vaccines prepared from individual patients. It is most difficult to control septic and other suppurative complications by local antiseptics.

The admission of diphtheria cases shews an increase, though the actual increase seems to me to be more apparent than real, for, as I have stated before, many of these patients, having patched throats are assumed, without having had bacteriological endorsement, to be diphtheria. Fairly often, the diagnosis arrived at in this way is incorrect. During the first five years of my hospital residence there were 15 cases of diphtheria admitted; during the last five years there were 2,940. I well remember when diphtheria was practically non-existent in Leeds. Then, about the year 1906, I well remember the disease breaking out in one class of scholars at St. Stephen's School, at Kirkstall. Thereafter it spread quickly to all parts of Kirkstall, afterwards to Chapeltown, and since it has seemed to be more or less present in every part of Leeds. The question arises in my mind, "Could this advancement of incidence have been stopped, had we had at hand immunisation by such a method as toxin-antitoxin as now practised in America and suggested by Dr. Copeman's recent report on diphtheria?" The answer tends towards the affirmative.

In treatment we depend on antitoxin. The success of this depends, in my opinion, not so much on the huge doses sometimes necessary and now largely advocated, as upon the time which has elapsed since the start of the illness and the use. Of the antitoxin Schick's test for toxin content might well be used to determine dosage and so probably and possibly tend to prevent the use of extravagantly large doses. I need not remind you that antitoxin is

expensive. Our annual bill at the hospital, on this account alone, is some £500 to £600.

The death-rate, thanks to the antitoxin treatment brought out by Behring and Kitusato in the year 1890, has fallen from 20 per cent. in 1890 to 6·5 per cent. in 1920, in the Leeds hospitals.

In typhoid fever, cases admitted have fallen from an annual average of 170 during the years 1890 to 1910, to an average of 72 during the quinquennial period 1911 to 1915, and to an average of 28 during the past 5 years ended 1920. Of 17 cases under treatment during the year 1921, there was not one death. Complications in the disease are now fewer than formerly; it is now about three years since a perforated bowel occurred. Partly no doubt due to decline in numbers treated and virulence, I think the complication list may have been reduced also by vaccine treatment now practised, which also, I believe, tends to prevent relapses and "carrier" incidence. In the treatment of prolonged and serious types of this disease, as in all septicæmias in which the blood has been denuded of complement, blood transfusion, if obtainable, ought to be considered.

On "Carrier" Cases.—"Return" Cases.

The last point, but by no means the least important, which I bring briefly before your attention, is the "carrier" patient, who, after apparent recovery from an infectious disease, and after a longer or shorter period, causes an illness of the same kind to others. In typhoid and diphtheria we have bacteriological tests which give fairly reliable information as to absence of the specific micro-organism. In scarlet fever, however, we have no such reliable means enabling us to make dogmatic statements of freedom from infection. We can only be guided by naked eye appearances of throat, nose, ears, and skin. The occurrence of the "return" scarlet fever case is disappointing and annoying alike to the hospital management and to the patient's friends. The number is about two to three per cent. of those treated. It would take too long to discuss this problem in this paper to-night. We might, however, briefly endeavour to indicate the probable causes, which seem to operate in all fever hospitals. We cannot eliminate the primary case as a cause which is due apparently mainly to the occurrence of septic catarrhal conditions. These and "return" cases seem more likely to arise at the termination of the annual scarlet fever outbreak *i.e.*, January to March, when meteorological conditions favour their incidence by reducing resistance on the return home of the primary patient to houses sometimes overcrowded with susceptibles; the house probably not always being in a perfect sanitary condition. Personally, I do not think that desquamation of the skin can be seriously considered as a contributory

cause. My own view is that the cause frequently lies in infected clothes, owing to defective disinfection either at the hospital or at the patient's home, or to articles which have escaped disinfection. The clothes are subjected to steam in a disinfector. I believe that this operation is not always effective. The operation requires great care. I have known live microscopic organisms to survive the usual operation by exposure of verminous clothes to steam in one of these machines. A somewhat striking feature of the connection of clothes in septic diseases like scarlet fever, diphtheria and erysipelas, is that of 559 persons over 12 years of age admitted in 1921, engaged in business and who were attacked with one of these diseases, 194 were engaged in working on clothes or cloth, or 34·7 per cent., tailors and tailoresses coming first with 15·2 per cent. There were only two laundresses in that number.

In conclusion, Fever Hospitals, at a large cost to the community, exist first to promote recovery from infectious diseases, and second to prevent spread of, and if possible to eradicate, infectious diseases. Do fever hospitals fulfil these objects ? After a long and somewhat eventful experience I think the tendency is to do so. In the earlier part of my time small pox and typhus were prevalent, though, intermittently, to a considerable extent ; perhaps we may expect a recurrence of small pox under present vaccination conditions, though for some years in Leeds these two diseases have been practically non-existent. Typhoid cases are admitted in fewer numbers each year. Scarlet fever and diphtheria show no marked decline in numbers. This, I think, is partly due to the working of the Infectious Diseases (Notification) Act and to some extent a consequent increase of cases, having a doubtful or wrong diagnosis : also partly due to improved methods of diagnosis. But in these latter diseases the complication-rate, the type, and the mortality have markedly decreased. May not these decreased rates indicate a possible future diminution of case incidence, and possibly eventual total extinction ?

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OF

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1921-22.

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1922.

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THE ROYAL SANITARY INSTITUTE

FOUNDED 1876.

ANNUAL REPORT OF THE COUNCIL

FOR THE YEAR 1921.

Read at the Ordinary General Meeting, April 26th, 1922.

INTRODUCTION.

The Council in presenting the Report for 1921 wish to comment on the active support given by the Members and Associates to the public work which the Institute is carrying on. Although the number of new elections has been rather smaller, the old Members and Associates have responded very readily to the increase in subscription rate that has been found necessary to meet the increasing expenditure. This has been of some assistance in the past year, and will have a greater effect in 1922.

ASSOCIATED WORK.

At the request of the Society of Medical Officers of Health the Council appointed representatives to a Joint Committee to consider the Qualification and Training of Health Visitors. The Committee had a number of meetings, and a report dealing with the various considerations involved and making certain recommendations was prepared and a copy was sent in to the Ministry of Health.

"HEALTH WEEK."

His Majesty The King and Her Majesty The Queen were graciously pleased to grant their Patronage annually to the movement.

The Right Hon. the Lord Mayor accepted the Chairmanship of the General Committee. Prof. H. R. Kenwood, C.M.G., acted as Vice-Chairman, and Prof. A. Bostock Hill, M.D., as Chairman of the Executive Committee, who carried out the organising arrangements.

Health Week, 1921, was observed from October 9th to 15th.

The motto adopted as the dominant idea was " Health, Happiness and Efficiency," and the consideration of what each individual can do for himself and his neighbour in securing a Healthy Life.

The General Statement setting out the objects, aims and suggestions for formation of Local Committee and programmes, was circulated with a covering letter to Health Authorities in the United Kingdom, and through the Journal of the Royal Sanitary Institute to all parts of the Empire.

It is known that celebrations took place in 50 centres, but correspondence with many other districts led the Committee to believe that meetings, school essays, etc., were also arranged in a number of other centres.

In London, arrangements were made, with the approval of the Education Committee of the London County Council, for Central Higher Grade and Elementary Schools to organise essay competitions on the subject " Habits and Health," for which the Health Week Committee offered prizes ; 109 essays were received, and 50 prizes were awarded.

The Committee recorded their appreciation of the careful and systematic instruction which had evidently been given in the schools, and this was conveyed to the London County Council, the Teachers, and the Educational Press, and attention was directed to the value of these competitions both from the Health and the Educational view.

The Committee were unfortunately handicapped by the Funds at their disposal only amounting to £237. Only £12 was received from Public Authorities, the remainder being contributed by Messrs. Nathan & Co., Messrs. Selfridge, Insurance Companies, the Chadwick Trustees, and the British Commercial Gas Association, who also contributed materially in other ways to the promotion of the work of the Committee.

PARLIAMENTARY WORK.

There were very few measures associated with Public Health introduced into Parliament during 1921, but the Parliamentary Committee had under consideration four minor Bills. It was not, however, thought necessary to take any action on the part of the Institute.

SESSIONAL MEETINGS.

Meetings were held in London in March and October, and in the following Provincial centres: Exeter, Manchester, Gloucester, and Stoke-on-Trent.

The subjects brought under discussion were: The Sanitary Engineering Side of Town Planning; Town Planning of Built-on Areas; Plumbing and Sanitation on Board Ship; The Sanatorium Question; Housing; The Use of Open Fires for Domestic Heating; The Present Position of Smokeless Fires; Air Pollution; Public Health Development in Gloucestershire; The Collection and Disposal of House Refuse; Activated Sludge; Smoke Pollution of the Atmosphere in the Potteries.

In connection with these meetings visits were made to New Houses and Insanitary Areas, Exeter; New Housing Estate, Chorlton-cum-Hardy; Cheltenham Refuse Destructor, Sewage and Waterworks; Tewkesbury Abbey and Waterworks; Pottery and Tile Works, Stoke; Destructor Works and the (Iwel) Model Meat Plant, Hanley; Activated Sludge Works, Hanley; and Bucknall Isolation Hospital

The Council are indebted to Dr. P. H. Stirk, Prof J. Radcliffe, Dr. J. R. Bibby, and Dr. Petgrave Johnson, for acting as honorary secretaries of the meetings in the Provincial centres.

STUDENTS' LECTURES.

Eight Courses of Instruction were conducted during the year, four in the spring and four in the autumn. The Courses were as follows: for Sanitary Officers, 80 students; for Meat Inspectors, 53 students; for Women Health Visitors and Child Welfare Workers, 92 students. The Special Courses for Army Officers and Professional men in Meat and Food Inspection were resumed for the first time since the war. The War Office detailed a total of 15 officers to attend the two Courses. A special Demonstration in meat examination and inspection was arranged for students preparing for the Diploma in Public Health, and was attended by 59 students from the Medical Schools at five of the London Hospitals, and from the Royal Army Medical College. The total number of students at the several courses was 299.

The Institute is indebted to the authorities and officers of the several public and private works visited during the Courses for their assistance in affording facilities and conducting students over the works.

EXAMINATIONS.

A supplementary examination in Tropical Hygiene has been arranged for Inspectors who are taking appointments in tropical stations. The syllabus covers special subjects not dealt with in the general Inspectors' Examination, and has received the general approval of the Colonial Office and the London School of Tropical Medicine. The first examination is being arranged to be held in London in April, 1922.

During the year Examinations were held at a number of centres in the United Kingdom, as follows :—

Aberdeen	Leeds (2)	Plymouth
Belfast	Leicester	Portsmouth
Birmingham (2)	Liverpool (3)	Preston
Bristol	London (5)	Sheffield
Cardiff	Manchester (3)	York
Edinburgh	Newcastle-upon-Tyne (2)	
Hereford		

At these Examinations 1,361 candidates presented themselves, and 683 certificates were awarded.

	Candidates Entered.	Candidates Certified.	Percentage of Successes
Sanitary Science as applied to Buildings and Public Works ...	76	23	30
School Hygiene, including Elementary Physiology	169	111	66
Women Health Visitors and School Nurses	342	181	53
Maternity and Child Welfare Workers	36	25	69
Inspectors of Nuisances	557	255	46
Inspectors of Meat and other Foods	175	83	47
Smoke Inspectors	6	5	83
	1,361	683	

The Sanitary Inspectors Examination Board (formed by The Royal Sanitary Institute and other bodies), which was established

for holding Examinations under the Public Health (London) Act, 1891, held two Examinations during the year. There were 76 candidates and 54 certificates were granted.

Particulars of Examinations held in other parts of the Empire are given on pages 103 to 106.

CONGRESS AND EXHIBITION AT FOLKESTONE.

The Congress was held in Folkestone in June, under the presi dency of the Rt. Hon. The Earl of Radnor. The Popular Lecture was delivered by Prof. E. Mellanby, M.A., M.D.

The business of the Congress was divided into five Sections and seven Conferences. During the Congress seventy-four addresses, lectures and papers were read at nineteen meetings.

The numbers attending the Congress were : 572 Delegates, repre-senting 350 Foreign and Colonial Governments, Government Departments, Municipal Authorities, and learned Institutions ; 188 Fellows, Members and Associates of the Institute (in addition to those appointed Delegates) ; 83 Associates of the Congress, ladies and others ; 125 complimentary and Press ; making a total of 968.

The Exhibition was arranged in the Drill Hall, and represented the various factors tending to promote public health. The exhibits were well set out, and formed a comprehensive and effective Exhibi-tion. There were 42 exhibitors, and the Judges awarded 19 Silver and 34 Bronze Medals, and selected 4 exhibits for further practical trial, one of which afterwards received a Bronze Medal. The Exhi-bition was open for nine days and was visited by 5,387 people.

LIBRARY.

Many Volumes and Pamphlets were added to the Library during the year, and it has been largely used by students attending the courses of training.

JOURNAL.

The *Journal* for 1921 was issued in six numbers. It consisted of 384 pages and 128 pages of supplement, and contained records of the Sessional Meetings held in London and the Provinces ; the remainder of the proceedings of the Birmingham Congress ; and the first part of the proceedings of the Folkestone Congress.

PARKES MUSEUM.

Considerable use was made of the Museum by Training Institutions from all parts of London and the neighbourhood for the training of their students in Public Health and sanitary matters. The number of students visiting the Museum was 1,786, in organised classes from 43 institutions and training schools.

The Museum also forms a valuable adjunct to the Institute's teaching work, and much use was made of it for the purpose of demonstrations to students at the Institute's Training Courses.

The Council gratefully acknowledge the receipt of a donation of £100 from the Chadwick Trustees, for the purposes of the Parkes Museum in consideration of its work in the promotion of Sanitary Science and its association with the founder of the Trust, Sir Edwin Chadwick, who was for many years a Vice-President of the Parkes Museum and of the Sanitary Institute of Great Britain.

With this sum at their disposal the Council have been able to renovate certain exhibits and to reprint the Sectional Catalogues and Guide to the Museum. These publications are found of much use to the Institute's students and to the various classes visiting the Museum from other Training Institutions.

BRANCHES IN THE DOMINIONS.

After many years of active association with the South African Branch in various official capacities, Dr. A. Jasper Anderson found it necessary during the year to resign the office of Honorary Secretary. Dr. Jasper Anderson was largely responsible for the initiation of the Branch, and the Council of the Institute and the Members and Associates in South Africa owe him a debt of gratitude for the great amount of energy and time which he gave to the affairs of the Branch, and to the development of its activities.

Mr. W. I. Perrott, B.A., of Cape Town, was appointed Secretary and Treasurer of the Branch.

The unfavourable conditions in Western Australia, to which reference was made in last year's report, have rendered it necessary to suspend the Branch in that State. The success of the Branch during its 13 years of existence was largely due to efforts of the Honorary Secretary, Mr. F. J. Huelin, and the Council hope that

it may shortly be found possible to revive the Branch and to continue its useful work in the promotion of Public Health.

The Council have given authority for the formation of Branches of the Institute in the Dominion of New Zealand, and in the State of New South Wales. The necessary steps are now being taken, and during the coming year it is hoped that these new Branches may be officially inaugurated.

EXAMINATIONS IN THE DOMINIONS.

In connection with the development in Public Health administration throughout the Dominions, it is interesting to note that in many cases the recent Health Acts and Regulations require definite qualifications for Sanitary Inspectors, and mention the certificate of the Royal Sanitary Institute for this purpose.

The Council much appreciate the services rendered by the officers and members of the various Boards of Examiners in the Dominions in carrying on this branch of the Institute's public work.

During the year Examinations were held by the Institute in—

Adelaide	Hong Kong	Pietermaritzburg
Bombay	Johannesburg (2)	Singapore
Cape Town (2)	Melbourne	Sydney (1920-21)
Georgetown	Montreal	Wellington
	Perth (2)	

At these Examinations 308 candidates presented themselves and 175 certificates were awarded.

Bombay.

An examination for Sanitary Surveyors, India, was held in July by the Institute in co-operation with the Government of Bombay ; 79 candidates presented themselves, and 58 were awarded certificates.

Straits Settlements.

During the year arrangements were completed for the Institute to co-operate with the Government of the Straits Settlements in holding Examinations for Sanitary Inspectors, Malaya, and a Local Board of Examiners was appointed. The first Examination was held in Singapore in December, 5 candidates presenting themselves, to 3 of whom certificates were awarded.

Canada.

An Examination was held by the Quebec Board, at Montreal, in February; 2 candidates presented themselves for the Meat Inspectors' Examination, and were awarded certificates.

New Zealand.

An Examination was held at Wellington in July. For the Sanitary Science Examination, 2 candidates presented themselves and 1 certificate was awarded. For the Inspectors of Nuisances Examinations, 7 candidates presented themselves and 2 certificates were awarded.

New South Wales.

During the year the report of the Examination held in Sydney in December, 1920, was received, when 1 candidate presented himself for the Sanitary Science Examination, but no certificate was awarded. Thirty-two candidates entered for the Inspector of Nuisances Examination, to 21 of whom certificates were awarded; 1 candidate entered for the Qualifying for Membership Examination, and was awarded a certificate; and 8 candidates entered for the Meat Examination, to 4 of whom certificates were awarded.

At an Examination held in Sydney in December, 1921, 3 candidates sat for the Sanitary Science Examination, and 2 certificates were awarded; 32 candidates sat for the Inspectors of Nuisances Examination, and 21 certificates were awarded; 3 candidates sat for the Meat Examination to whom certificates were awarded.

Victoria.

An Examination was held in Melbourne in December. For the Health Visitors' Examination, 6 candidates presented themselves to whom certificates were awarded, and 23 candidates for the Inspectors of Nuisances Examination, 6 certificates being awarded.

Western Australia.

Examinations were held in Perth in April and December. At these Examinations 5 candidates presented themselves for the Sanitary Science Examination, 1 certificate being awarded; 2 candidates presented themselves for the School Hygiene Examination, 1 certificate awarded; 22 candidates entered for the Inspectors of Nuisances Examination and 14 certificates were awarded; for the Meat Inspectors' Examination there were 2 candidates, but no certificates were awarded.

South Australia.

An Examination was held in Adelaide in December. For the Inspectors of Nuisances Examination, 6 candidates presented themselves and 2 certificates were awarded. For the Meat Inspectors Examination, 1 candidate presented himself and was awarded a certificate.

British South Africa.

Examinations were held in Cape Town, Johannesburg, and Pietermaritzburg in November. At these Examinations 2 candidates presented themselves for the Sanitary Science Examination, 1 certificate was awarded; 71 candidates presented themselves for the Inspectors of Nuisances Examination, and 21 certificates were awarded.

Examinations for Meat Inspectors were held in Cape Town and in Johannesburg in December. At these Examinations 7 candidates presented themselves and 4 certificates were awarded.

British West Indies.

The extended Board of Examiners for the British West Indies came into operation during the year and held their first Examination under the new arrangement in Georgetown, British Guiana, in July. 8 candidates presented themselves for the Health Visitors Examination and 4 certificates were awarded. 11 candidates presented themselves for the Inspectors of Nuisances Examination, and 3 certificates were awarded.

Hong Kong.

An Examination was held in Hong Kong for Inspectors of Nuisances in December. 9 candidates presented themselves and 7 certificates were awarded.

During the year a Board of Examiners was appointed in co-operation with the Government of Straits Settlements for holding examinations for Sanitary Inspectors in Malaya. Arrangements were also being made for holding an examination in Baghdad on lines similar to those on which Examinations were held for the Army in France during the war.

For Ontario, Saskatchewan, Alberta, Queensland, Tasmania and Burma, no reports have been received of Examinations held during the year.

FINANCE.

The accounts show a balance of Expenditure over Income of £216 8s. 3d. This deficit was anticipated in the estimates for the year, and is due to some reduction in the number of candidates for Examinations, to the increase in Postal rates, and to other causes.

During the year the Council decided that it had become necessary to increase the subscription of the existing Members and Associates of the Institute, and it is interesting to note that a large number have availed themselves of the arrangement for compounding their subscriptions under the graduated scale for Life Commutation. This enabled the temporary loan from the Bankers to be reduced, thus saving the payment of interest.

OBITUARY.

The Council regret to announce the death of the following :—

Vice-President : Dr. A. Wynter Blyth. *Honorary Fellows :* Dr. Leon Becerra, Dr. V. Cornil, Dr. A. J. Martin, Dr. A. Palmberg. *Fellows :* Col. C. E. Cassal, Sir Charles A. Cameron, Dr. H. E. Corbin, Prof. A. S. Delepine, Dr. G. B. Longstaff, Dr. G. Wilson, Sir G. Sims Woodhead. *Members :* G. H. Anderson, Surg.-Gen. H. L. Clare, R. C. Das, Dr. D. D. Gold, G. B. Grave, Luke M. Hill, J. A. Heap, Dr. W. M. Hamilton, L. D. Loomba, J. Manley, Dr. J. C. McWalter, J. W. Moncur, S. K. Nariman, B. M. Samuelson, C. E. Wilkinson. *Associates :* A. W. D. Brown, A. R. Burston, R. L. Corbett, Miss M. Curwen, W. Douglas, D. Evans-Jones, D. Fergusson, J. E. Firth, C. H. France, A. B. Linford, Mrs. N. F. Malone, H. Nathan, T. H. Negus, J. W. Patterson, F. J. Pearce, W. A. Powell, G. B. Spragg, P. C. Steventon, S. H. Taylor, T. Tribe, J. O. Vaughan.

EPITOME OF REGISTERS OF MEMBERS AND ASSOCIATES.

	Hon. Fellows.	Fellows.	Members.	Associates.	Total.
Dec. 31st, 1920 ...	35	272	1,928	2,396	4,631
Dec. 31st, 1921 ...	33	261	1,926	2,299	4,519

The number of new Members and Associates joining the Institute during 1921 was not so large as in the previous year, and the total on the Register was also affected by a rather larger number of resignations than usual, due in some measure to the increase in the subscription rate which the Council found it necessary to make.

With the co-operation of the Members, the Council hope that the upward tendency in the Membership will be resumed, and that in next year's report it will be possible to record that the total number on the Roll exceeds that in any previous year.

EPITOME OF THE WORK OF THE INSTITUTE, 1921.

		Attendances Total.
	London Meetings and Examinations.	
1	Lecture to Institute	35
2	Sessional Meetings	85
369	Lectures and Demonstrations and Inspections, Sanitary Officers, etc.	11,474
17	Examinations	547
171	Council, Committee and General Meetings	790
128	Classes brought to Museum	1,786
	Congress and Exhibition at Folkestone.	
2	Addresses and Lectures	1,150
8	Sectional Meetings	950
9	Meetings of Conferences	867
	Exhibition open 9 days	5,387
	Provincial and Colonial Meetings.	
4	Sessional Meetings	340
115	Examinations	1,122

HENRY KENWOOD,
Chairman of Council.

E. WHITE WALLIS,
Secretary.

11th April, 1922.

STATEMENT OF INCOME AND EXPENDITURE

Dr. EXPENDITURE.

		£	s.	d.	£	s.	d.
	Establishment Charges :—						
To	Ground Rent, Rates, Taxes, and Insurance	721	6	7			
,,	Salaries and Wages	3,957	17	1			
,,	Contribution to Thrift and Benefit Scheme ...	235	2	1			
,,	Coals, Lighting and Care of Offices	250	5	10			
,,	Repairs and Alterations	143	19	11			
,,	Library, Binding, etc.	14	9	11			
,,	Postage, Telegrams, Telephone and Carriage	469	17	1			
,,	Printing, Stationery and Advertising ...	508	14	2			
,,	Incidental Office Expenses	120	8	0			
,,	Office Furniture	12	11	8			
,,	Interest on Loan	95	18	7			
					6,530	10	11
	Special Expenses, exclusive of Establishment Charges :—						
To	Journal and Publications, Cost of Printing etc., less Sales and Advertisements ...	751	6	9			
,,	Sessional and other Meetings	70	19	3			
,,	Lectures, Sanitary Officers and others ...	643	9	7			
,,	Examinations	2,442	10	4			
,,	,, Colonial	777	14	11			
,,	Colonial Branches	31	5	7			
,,	Congress at Folkestone	677	18	8			
,,	Exhibition at Folkestone	1,188	16	1			
					6,584	1	2
					£13,114	12	1

ACCUMULATED OR

		£	s.	d.
To	Annual Allowance for Depreciation of Leasehold Values ...	70	0	0
,,	Income and Expenditure Account, Balance for the Year ...	216	8	3
,,	Balance to be carried forward to next Account	12,970	6	3
		£13,256	14	6

FOR THE YEAR ENDED 31st DECEMBER, 1921.

INCOME.

		£ s. d.	£ s. d. Cr.
	General Receipts :—		
By	Annual Subscriptions, less Arrears written off	3,797 2 5	
,,	Interest on Investments, etc., after allocation of Interest to Special Funds	81 3 0	
			3,878 5 5
	Special Receipts :—		
By	Lectures, Sanitary Officers, and others ...	1,244 18 3	
,,	Examinations	4,612 3 1	
,,	,, Colonial	877 13 0	
,,	Congress at Folkestone	748 6 9	
,,	Exhibition at Folkestone	1,499 15 1	
,,	Letting of Rooms	37 2 3	
			9,019 18 5
			12,898 3 10
,,	Balance of Expenditure over Income		216 8 3
			£13,114 12 1

RESERVE FUND.

		£ s. d.
By	Balance from last Account	13,043 2 6
,,	Appreciation of Investments	213 12 0
		£13,256 14 6

PARKES MUSEUM

		£	s.	d.
To	Printing Catalogues, Additions and Renovations to Exhibits	63	18	9
,,	Balance to be Carried Forward to next Account	88	0	3
		£151	19	0

"HEALTH WEEK"

		£	s.	d
To	Balance from last Account	17	18	5
,,	Printing, Advertising and Organisation Expenses ...	205	8	5
,,	Balance to be Carried Forward to next Account	14	7	8
		£237	14	6

GENERAL BALANCE SHEET,

LIABILITIES.

		£	s.	d.	£	s.	d.
To	Fees and Subscriptions paid in advance for 1922	420	9	6			
,,	Health Week, Balance at Credit thereof ...	14	7	8			
,,	Sundry Creditors	1,737	15	11			
,,	Loan from Bankers	1,500	0	0			
					3,672	13	1
To	Credit Balances :—						
	Library Catalogue Account	90	0	0			
	Life Composition Fund	1,901	4	5			
	Museum Arrangement Fund	88	0	3			
	Accumulated Fund	12,970	6	3			
					15,049	10	11
					£18,722	4	0

SAXON SNELL

		£	s.	d.	£	s.	d.
To	Expenses				2	5	3
,,	Balance carried forward to next account ...				791	12	3
	Represented as under :—						
	Amount invested in £725 7s. 9d. 3 per cent. Metropolitan Water Board "B" Stock at cost	*700	0	0			
	Cash at Bank available for Prizes and Expenses	91	12	3			
		£791	12	3			
					£793	17	6

*N.B.—The market value of this Investment on 31st December, 1921, was £406.

Examined with the Books, Vouchers and Accounts, and found correct.

March 29th, 1922.

ARRANGEMENT FUND.

	£	s.	d.
By Balance from last Account	44	14	9
,, Donation, Chadwick Trust	100	0	0
,, Miscellaneous Receipts	7	4	3
	£151	19	0

ACCOUNT.

	£	s.	d.
By Donations, etc.	237	14	6
	£237	14	6

31st DECEMBER, 1921.

ASSETS.

	£	s.	d.	£	s.	d.
By Leasehold Premises, Buckingham Palace Road (90 years from 1888), less depreciation				12,604	0	0
,, Library and Contents of Museum	1,071	0	0			
,, Furniture and Fixtures	807	0	0			
,, Stock of Publications	110	15	0			
				1,988	15	0
,, Subscriptions in Arrear	487	1	6			
,, Sundry Debtors	1,002	8	2			
				1,489	9	8
,, Cash at Bank and in hand				110	15	4
,, Investments at Market Value on December 31st, 1921 :—						
£1,500 0s. 0d. 4% New Zealand Stock ...	1,335	0	0			
£500 0s. 0d. 3½% New South Wales Stock	470	0	0			
£510 0s. 0d. 3½% New Zealand Stock ...	367	4	0			
£700 0s. 0d. 3% India Stock	357	0	0			
				2,529	4	0
				£18,722	4	0

PRIZE FUND.

	£	s.	d
By Balance from last Account	772	2	4
,, Interest on Investments	21	15	2
	£793	17	6

WOOD, DREW & Co., *Chartered Accountants*
W. COLLINGRIDGE, } *Auditors.*

REVIEWS OF BOOKS.

The W.D. Drainage Manual.*

The third revision of the W.D. Drainage Manual (by Mr. W. C. Tyndale, O.B.E., M.Inst.C.E., F.G.S., F.R.San.Inst., and Sanitary Engineer to the War Office) is a welcome contribution to the literature of drainage and sewerage.

The establishment of camps, large and small, throughout the country during the war has presented many and diverse drainage problems, in the solution of which much valuable experience has been gained. The present edition of the Manual sets forth the results of this experience, and of that obtained in the management of permanent barracks, in a concise and convenient form. Though primarily addressed to those charged with the construction and maintenance of W.D. buildings, it will be of value to all who have to do with drainage or sewerage or with sewage disposal.

As might be expected from an author of Mr. Tyndale's experience, the book is conspicuously free from those pedantries which one so often finds copied from one text-book to another. The question of maximum and minimum gradients, for instance, is treated with a wholesome regard for realities.

Some of the statements in the sewage disposal section seem to require qualification. Contact beds, for example, even when new, rarely have a working capacity equal to 50 per cent. of their cubic contents. A sedimentation tank is *not* a septic tank, and endless trouble is often caused by the want of a clear understanding at the outset as to the lines upon which a tank is going to be worked.

In stating, on page 49, that there are practically no objections to the use of trickling filters, the author loses sight of that risk of nuisance to which he subsequently calls attention, and of the liability of coarse filters to encourage the breeding of flies. His recommendation of a fine top layer for the interception of suspended particles will not commend itself to the many engineers who prefer to allow the matter in question to pass freely through their beds.

There may conceivably be circumstances in which a leaky cesspit can be used without positive danger; but the cases must be very rare in which urine and slop-water cannot be better disposed of by other means.

Two of the most valuable sections of the Manual are those dealing with the little understood subject of land drainage, and with the laying out and management of sewage farms. The notes on sludge disposal are particularly sound; and the detailed suggestions for cropping different classes of soil will meet a widefelt need.

Appendix I., giving the velocities and discharges of drains and sewers at different gradients for every inch in depth, is most useful, and will save much tedious calculation.

There are 21 full page plates, in addition to the many sketches printed with the text.

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*The W.D. Drainage Manual. Third Edition. Revised to 1921. F'cap, 78 pp, 21 plates. London. 1921. H.M. Stationery Office. Price 5s.

It is not often that one finds so much valuable matter compressed into so small a space, or subjects presenting so many controversial points dealt with in a manner to which so little exception can be taken. The book is well written and eminently readable, and remarkably free from technicalities. It will, therefore, be read with pleasure and profit by many who have no professional concern with sewerage or sewage disposal. No student of these subjects should be without a copy of it.

A. J. M.

Building Repairs.*

This is an extremely useful book, quite practical from cover to cover, and evidently written by an expert thoroughly acquainted with the class of works under its title.

Though containing 200 pages, it is concise and quite to the point in every line besides being amply illustrated.

It is a practical guide in all repair work, and therefore should commend itself to builders, property owners, house agents, clerks of works, sanitary officers, and others who have to examine property and carry out general repair work.

Its seven chapters include all the trades required in any necessary building repairs, and the scope of its information is ample for their complete execution.

The index, however, is meagre, and it would be an advantage in looking up matters if it were considerably extended, considering the many topics of the book.

Again, it would be more " self-contained " if the author could see his way, in a subsequent edition, at the end of each chapter, to insert several items of useful memoranda applicable to the special trade subjects therein.

J. E. W.

The Lay-out of Small Water Mains.†

This is a handy and concise book, written particularly for the use of waterworks engineers and managers, who, in far too many instances, are satisfied to fix the size of subsidiary or distributing mains in a haphazard manner, without making any attempt to calculate the proper economical sizes, in accordance with the requirements and conditions.

With this book before them there can be no excuse for perpetuating guesswork methods, as the formulæ and their application to the various ramifications involved in a " lay-out " are expressed in simple arithmetical terms, with references to complete and readily understandable tables at the end of the book.

The author deals with, and illustrates by a number of diagrams, the various cases involving the use of single, double, multiple, loop, and circuit

*Building Repairs, by Ernest G. Blake, M.R.S.I. 8vo., 200 pp, 84 illustrations. London. 1921. B. T. Batsford, Ltd. Price 8s. 6d.

† The Lay-out of Small Water Mains, by H. H. Hellins, M.Inst.C.E. 8vo, 45 pp., eight inset tables. London, 1921. Sir Isaac Pitman & Sons, Ltd. Price 7s. 6d.

mains, where the pipes are of uniform diameter, and also where the diameters are varying.

The book, which is exceptionally well printed, is published at a very reasonable price, and should be in the hands of everyone responsible for the economical lay-out of " subsidiary " water mains.

The title of the book is a little misleading, as the diameters dealt with in the tables range up to as much as 15 ins., and pipes of that size can hardly be termed small.

W. M.

The Prevention of Malaria in the Federated Malay States.*

This excellent book is a detailed history of the prevention of Malaria in the Federated Malay States, from the earliest institution of preventive measures.

To review such a book critically is impossible for any one not intimately conversant, not only with the localities dealt with, but also with the history of similar preventive measures in other parts of the world. A great deal of the book is highly technical, but Dr. Watson has the gift of making such technicalities not only intelligible to the ordinary reader, but, also what is even more important, interesting. As recounted by him the story of the war against disease is made almost as dramatic as that of a war against a human foe. Take, for instance, the too short chapter " On Mosquitoes " (XXV.), describing how one species of Mosquito replaces another according as the local conditions change, when slow running turbid streams are changed into fast running clear brooks,or when the silting up of a ravine destroys the vegetation.

The moral running through the book is that the only certain method of eradicating malaria is drainage, carried out systematically and with brains. Very striking are the instances adduced, as at Port Swettenham, where a new system of drainage interfered with a previously effective one, thus allowing of a return of the disease after it had been once eradicated. So, too, are the accounts of the effects of road and railway embankments in heading back surface drainage and providing breeding grounds for the malaria carrying mosquitoes.

Though the book deals directly only with practical measures in the Federated States, it is nevertheless an indispensable handbook to any officer, Medical or Administrative, whose duties lead him to undertake the " white man's burden " in tropical countries.

There are not wanting signs that the yellow and brown races are only too anxious to relieve the white man of that burden, and take it on their own shoulders. That man would be an optimist who should expect that an administration formed only of indigenous members in the Malay States or India would ever take the long views necessary for the inception of the drainage systems that intelligent malaria prevention demands. The present writer is an optimist in most things, but on this question he feels impelled to the belief that one of the first results of handing back the rule of our

*The Prevention of Malaria in the Federated Malay States, by Malcolm Watson, M.D., C.M., D.P.H. 8vo., 381 pp., illustrated. London. 1921. John Murray. Price 36s.

Tropical Dependencies to the native inhabitants of the country will be a neglect of all defensive measures, whether directed against human foes or disease, where such measures demand the expenditure of money, in other forms than as salaries to their friends and relations. If this forecast prove true, one of the first results of Home Rule in tropical countries will be a return of malaria to localities from which the British Administrator and M.O.H. have driven it.

In the meantime these officers will, of course, do their best, and they can have no better guide in whatever part of the tropics their work posts them than Dr. Malcolm Watson's treatise.

C. H. M.

Tropical Home Nursing.*

A useful book, which has proved its value by attaining to its thirteenth edition. It can be confidently recommended to every woman going out to the tropics, married or single. There is nothing particularly original or striking about the book, apart from the distinguished record of its author, as exhibited on the title page and Appendix III.

C. H. M.

Typical Flies: a Photographic Atlas.†

This is a supplementary volume completing the first series of British types of Diptera which appeared in 1915. The volume contains, in addition to a Preface to the second series, the Preface to the first series, in which is contained very valuable notes by the author as to the catching, the preparation, and storage of flies, preparatory to their photography. The chief season for collecting flies in this country is from March till October, the sunny forenoon being the best time of day. Windy days are very unproductive. Flies seem very capricious in their habits, but like other creatures they have special haunts where they may usually be found at the proper season. Generally speaking, umbelliferous plants, also bramble, hawthorn and ivy bloom seem to be most attractive. Flies often settle upon gate posts, railings, and tree trunks, especially if decayed. Others frequent salt marshes and swamps, ponds and river-sides; whilst heath-lands, sheep-runs, bare hot sandy areas and commons attract others. Horse and cattle droppings and decomposing animal and vegetable matters are well-known baits for many species. Others attack living animals, not excepting man; and certain flies prey on insects and spiders. The photographs of the flies, ova, pupæ and larvæ are all enlargements, and are very clear. Habitats of some of the flies are also reproduced. There is a short descriptive label to each photograph, *e.g.*, Fig. 71, *Stomoxys calcitrans L.* Male, 6 mm, frons to tip of abdomen (showing mouth parts). Hurtful to horses, and biting people from its resting

*Tropical Home Nursing, by Colonel R. J. Blackham, C.B., C.M.G., C.I.E., D.S.O., M.D., D.P.H. 16mo., 177 pp. London. 1921. Dale, Reynolds & Co., Ltd. Price 2s.

†Typical Flies: a Photographic Atlas, by E. K. Pearce. Second series. Large 8vo., 38 pp. Cambridge. 1921. Cambridge University Press. Price 15s.

place on windows in autumn. This species, which is grey in colour with black spottings, is the commonest biting fly among the Muscidæ. It has often made horses uncontrollable, and cattle are driven wild by it. " It can be distinguished by its habit of sitting sideways." (Harwood.)

L. C. P.

Public Health Surveys.*

Sanitary Surveys, as Prof. G. C. Whipple prefers to call them in his Introduction, are designed to reveal weak spots, and by the study of all the facts of the situation to ascertain how impending dangers may be avoided by timely action ; they may serve as guides for estimating relative values, for distributing public expenditure on health matters ; and they are always useful as historical records.

The idea of Sanitary Surveys is not new. From the time (1844-1851), when Sir Robert Rawlinson prepared his memorable surveys, to the present day, they have accumulated in very large numbers in this country ; but the author's work is amply justified on the score that it offers useful guidance and suggestions as to standardisation to all those who may be called upon to make such surveys in the future.

Many Health Surveys, varying in their scope, have been undertaken, especially in recent years, in America. There have been Tuberculosis Surveys, Malaria Surveys, Hook-worm Surveys, Sickness Surveys, and General Health Surveys, in addition to Housing and Sanitation Surveys.

The book has value as a text-book, for useful introductory observations are made upon each of the various matters which may be the subject of a Health Survey, before the headings of the information which should be collected are dealt with. A Sanitary Survey to be acceptable must be made by one of knowledge and experience ; and to be of service as an activating instrument to the community and the Local Health Authority the lessons of the Survey must be set out and used with judgment and discretion.

The author gives considerable prominence to the need for publicity, before, during and after the survey, to arouse public interest and to form public opinion in reference to the findings of the survey and the recommendations of the report.

Judging from some very crude conditions which are illustrated in the book, as, for instance, Fig. 54 (" A shack having only one room where two families resided. Water and sewer facilities were absent ") and Fig. 85 (" A contagious diseases hospital "), the need for Health Surveys and for their activating effect would appear to be greater in the United States of America than in the British Isles.

Despite some diffuseness and repetition, the work which the author has set himself to accomplish has been well done ; it bears the imprint of careful thought and of experience, and the book may be recommended as a useful guide to the making of " Public Health Surveys."

H. R. K.

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* Public Health Surveys, by Murray P. Horwood, M.S., Ph.D. 8vo, 403pp., illustrated. New York. 1921 Chapman & Hall, Ltd., London. John Wiley & Sons, Inc., New York. Price 24s.

The Use of Death-rates as a Measure of Hygienic Conditions.*

This book constitutes No. 60 of the special series of the Medical Research Council. The title is an interesting one to the Medical Officer of Health, and, according to the introduction, the book is written for him, as well as for the generally informed person and the statistician.

It would appear no easy matter to write a book on this intricate subject for persons with knowledge so widely different, but Dr. Brownlee has achieved his aim in the production of a very interesting and readable book. His uncramped literary style and the interspersion of apt quotations at the head of different sections succeeds in whetting the appetite of the reader for what is underneath the surface.

It is an easy matter to start off a subject with a quotation, and end up with a potage of indigestible facts. Dr. Brownlee uses no such camouflage, for below the surface the reader finds easily understood and useful facts placed before him by an expert.

The book is well worth perusal by all Medical Officers of Health, for it affords not only extremely interesting reading, but sheds new lights on death rates, which it will be to their advantage to know.

G. F. B.

Manual of Physio-Therapeutics.†

In a substantial volume the author presents the case for the treatment of defects and various "ills by using sense and fewer pills."

The war gave an impetus to many branches of medicine and surgery, and Dr. Luke enthusiastically recounts the advances made in recent years in thermo-therapy, hydro-therapy, massage and electro-therapeutics.

The chapter on medical gymnastics leads us to some furious thinking. We read that vibration over the liver will do as much in five minutes to promote the flow of bile as forty minutes on horseback, and a few minutes' gentle scratching on the skin just below the left cortal margin . . . will cause the emptying of the stomach towards the later stages of digestion.

It is better to be a vibrator than a hack in these days of economy.

J. C.

The School of Hygiene and Public Health.‡

There are 55 papers in this volume. Many of them are concerned with problems of immunity and bacteriology, but the following are of interest to the hygienist :—

Studies on Experimental Rickets : (1) The Production of Rachitis and similar Diseases in the Rat by deficient Diets ; (2) The Effect of Cod Liver Oil administered to Rats with Experimental Rickets ; (3) A Pathological Con-

* The Use of Death-rates as a Measure of Hygienic Conditions, by John Brownlee, M.D., D.Sc. 8vo., 80pp. London, 1922. H.M. Stationery Office. Price 3s.

† Manual of Physio-Therapeutics, by T. D. Luke, M.D., F.R.C.S.Ed. 8vo, 48 pp., illustrated. London, 1922. William Heinemann. Price 25s.

‡ The School of Hygiene and Public Health. John Hopkins University. Collected Papers, Vol. II 1920-1921. 8vo. 1921. Baltimore.

dition bearing Fundamental Resemblance to Rickets of the Human Being resulting from Diets low in Phosphorus and Fat-soluble A Vitamin and the Phosphate Ion in its Prevention. Five Papers by the same Author on Supplementary Protein Values in Foods. The Relation of certain Carrier Conditions to the Virulence of Nemolytic Streptococci. Experiments on the Carriage of Intestinal Protozoa of Man by Flies. A Contribution of Genetics to the Practical Breeding of Dairy Cattle. The Effect of the War on the Chief Factors of Population Change. On the Rate of Growth of the Population of the United States since 1790 and its Mathematical Representation. Variation in the Rate of Infantile Mortality in the United States Birth Registration Area. The Relative Influence of the Constitutional Factor in the Etiology of Tuberculosis. Influenza Studies in the 1918 Epidemic : Correlations of Explosiveness of Outbreak and Epidemic Destructiveness. The Natural History of Typhoid Fever in Baltimore. The Real Risk-Rate of Death to Mothers from Causes connected with Childbirth. A Method for Determining the finer Dust Particles in Air.

The volume is illustrated with many plates, diagrams, and tables, and is a good indication of the enormous amount of work now being carried on in the United States in the domain of Preventive Medicine.

L. C. P.

MEETINGS HELD.

ORDINARY GENERAL MEETING.

The meeting was held at the Institute on April 26th, at 4.30 p.m. William Whitaker, B.A., F.R.S., was elected an additional Vice-President; and the following as new members of Council :—Major-General W. W. O. Beveridge, C.B., C.B.E., D.S.O.; Prof. E. R. Matthews, F.G.S., F.R.S.E., A.M.Inst.C.E.,; J. S. Owens, B.A., M.D., A.M.Inst.C.E.; W. M. Willoughby, B.A., M.D., D.P.H.

Lecture to the Institute.

The Lecture was given at the Institute on Wednesday, April 26th, at 5.30 p.m., on "The Outlook in Tropical Hygiene," by Andrew Balfour, C.B., C.M.G., M.D. The Chair was taken by Prof. H. R. Kenwood, in the absence through ill health of the President, His Grace the Duke of Northumberland.

Sessional Meetings.

London.—A meeting was held at the Institute on Tuesday, March 14th, when a discussion on "Central Heating in Relation to Domestic and other Dwellings," was opened by A. H. Barker, B.A., B.Sc. The Chair was taken by Sir Henry Tanner, C.B., I.S.O., F.R.I.B.A., Vice-President of the Institute.

Blackburn.—The meeting was held in the Public Halls on Friday, March 17th, when discussions on "The Sanitation of Places of Entertainment" and "Conversion of Pail Closets," were opened by W. Allen Daley, M.D., D.P.H., Medical Officer of Health, and A. T. Gooseman, M.Inst.C.E., Borough Engineer. The members were received and entertained to tea and to light refreshments after the meeting by His Worship the Mayor; the Chair was taken by Prof. H. R. Kenwood, C.M.G., M.B., F.R.S.E, Chairman of Council.

On Saturday, March 18th, visits were made to Messrs. Whitaker's Sanitary Ware Works, the Corporation Sewage Works, Hospital and Refuse Destructor, to newly erected houses and houses in course of erection, Picture-dromes, the new Public Halls, including the Ozonair system of ventilation, Tuberculosis Dispensary, Maternity Hospital, conversions in progress.

London.—A meeting was held at the Institute on Tuesday, April 11th, when a discussion on "Economy in Sanitary Appliances and Methods of Drainage," was opened by Sir Henry Tanner, C.B., I.S.O., F.R.I.B.A. The Chair was taken by Professor H. R. Kenwood, C.M.G., M.B., F.R.S.E., Chairman of Council.

Examinations.

Since the last issue the following examinations have been reported :—

Perth, W.A., Dec. 2nd and 3rd.
Melbourne, Dec. 7th, 8th and 10th.
Sydney, Dec. 15th and 14th.
Adelaide, Dec. 8th, 9th and 12th.
Preston, Feb. 17th and 18th.
Norwich, March 3rd and 4th.
Portsmouth, March 17th and 18th.
Edinburgh, March 24th and 25th.
Bristol, March 31st and April 1st.
Sheffield, April 7th and 8th.
London, April 21st and 22nd.

For Inspectors of Meat and other Foods.

Manchester, February 24th and 25th.

At these examinations 445 candidates presented themselves, and the following were awarded certificates :—

Sanitary Science as applied to Buildings and Public Works.

Braithwaite, William Edward, *Glebe.*
Cooke, William Levington, *Cork.*
Dewar, Henry David, *Canterbury, N.Z.*
Diaz, Facundo, *Wandsworth.*
Golding, Harold Campbell, *Clevedon.*
Richards, William John Rowe, *London.*
Smith, George Henry, *Norwich.*

Inspectors Qualifying for Membership.

Jones, George Handel, *Diss.*

Maternity and Child Welfare Workers.

Roberts, Annie, *Tooting.*
Sowels, Margaret Annie, *Thetford.*
Weir, Hannah, *Newcastle.*

Women Health Visitors and School Nurses.

Betts, Joan Philippa, *London.*
Black, Maude Eliza, *Exeter.*
Blagg, Beatrice *London.*
Booth, Olive, *Todmorden.*
Brett, Marjorie Estelle, *S. Tarra.*
Burdett, Marion Edith, *Highgate.*
Croll, Martha Helen, *Aberdeen.*
Daintrey, Evelyn, *London.*
Darroll, Aileen Frances, *Leintwardine.*
Davies, Gertrude, *Fairfield.*
Davies, Louise Septima, *London.*
Dolman, Miriam, *Bristol.*
Douglas, Grace, *Melbourne.*
Draper, Annie E., *Guildford.*
Dredge, Annie, *Hertford.*
Dunn, Eva Mary, *Borough.*
Fisher, Edith, *Bristol.*
Forsyth, Amy Millicent, *Tobermory.*
Fussell, Mabelle Augusta, *Edinburgh.*
Gillett-Gatty, Emma Katherine, *London.*
Glover, Jean, *London.*
Griffin, Josephine, *Braco.*
Hall, May Eleanor, *Auburn.*
Henniker, Constance Mary, *Norbiton.*
Horwood, Constance Adelaide, *Brighton.*
Hubble, Mary Amelia, *Hayes.*
Hudson, Stella Mary, *Woolwich.*
Husbands, Thirza Isabel, *Blackheath.*
Jervis, Dorothy Gladys, *Bristol.*
Johnson, Dorothy Gertrude, *Bedford Park.*
Johnson, Gwendoline Margaret, *Bristol.*

Johnson, Winifred Adele, *Bristol.*
Knuckey, Beatrice Mary, *Exeter.*
Laing, Ethel Stachey, *Birkdale.*
Lake, Margaret, *Battersea.*
Lee, Annie Newcombe, *Hampton Wick.*
Leigh, Lilian Florence, *Wimbledon.*
Mertens, Edith Lee, *London.*
Milne, Georgina Innes, *Aberdeen.*
Munro, Ella, *Foula Isle.*
Neal, Maggie, *Woolwich.*
Norledge, Sarah, *Motherwell.*
Pain, Hilda Margaret, *Exeter.*
Parkin, Aline, *Blackpool.*
Paterson, Dorothy Helen Margaret, *Edinburgh.*
Preston, Lucy E., *Southampton.*
Phillips, Amy Minnie, *Exeter.*
Pickard, Mary, *Leeds.*
Porteous, Mary, *Bishop Auckland.*
Rhead, Ethel Pearl, *Brixton.*
Riley, Olive Graham, *Warrnambool.*
Robinson, Cecile Bradbury, *London.*
Ross, Frances Ridley Havergill, *London.*
Russell, Marion T., *Coseley.*
Samson, Mary Caroline, *Southampton.*
Shannon, Elizabeth, *Hastings.*
Sharp, Rhoda Kathleen, *Horncastle.*
Symes, Margaret Winifred, *Sherborne.*
Taylor, Florence Daisy, *Sittingbourne.*
Thorburn, Janetta Douglas, *Kilmarnock.*
Turk, Daisy J., *London.*
Varey, Gertrude, *Haydock.*
Wailes, Mary Esther Anne, *Wimbledon.*
Wakeham, Muriel Marion, *Dalston.*
Walker, Muriel Annette, *Aberdeen.*
Whyte, Anna Christine, *Holbeck.*
Wignall, Amy, *London.*

School Hygiene, including Elementary Physiology.

Acworth, Lilian Dorothy, *Bedford.*
Anderson, Ruth, *Bedford.*
Angus, Anne Madeline, *Bedford.*
Barrett, Winifred Alice Cridlan, *Bedford.*
Bilney, Nancy Hope, *Bedford.*
Birdsall, Audrey, *Bedford.*
Blackburne, Amy Kathleen, *Bedford.*
Burtt, Barbara H., *Bedford.*
Carson, Sylvia Mary Margaret, *Bedford.*
Charlton, Annie, *Bedford.*
Charteris, Margaret Aimee, *Bedford.*
Cook, Mary, *Bedford.*
Esbester, Edna Mary, *Bristol.*
Forsyth, Jean Westwood, *Bedford.*
Gib, Faith Howard, *Bedford.*
Gillespy, May Evelyn, *Bristol.*
Granville-Smith, Lydia Margaret, *Bedford.*
Hall, Nora Isabel, *Bedford.*
Hallett, Lucy Evelyn, *Bristol.*
Harford, Ida Catherine, *Bedford.*
Henson, Marie Benita, *Bedford.*
Ingram, Helen Mary Loreen, *Bristol.*
James, Enid Croft, *Bedford.*
Jolly, Katherine, *Bedford.*
Jones, Crystobel Gwyther, *Bedford.*
Kenyon, Irene Helen, *Bedford.*
Kingsford, Katherine Mildred, *Bedford.*
Lambert, Eloise Marion, *Bedford.*
Laycock, Hannah Margaret, *Bedford.*
Lowth, Margery, *Bedford.*
McCappin, Dorothy, *Bedford.*
Millar, Isabella Katherine, *Bedford.*
Mitchell, Lorna Joyce, *Bedford.*
Montgomery, Evelyn Ruth, *Bedford.*
Nicholson, Enid Charlotte Louise, *Bedford.*

PAGE, GLADYS KATHLEEN, *Bedford.*
PARSONS, KATHLEEN GERTRUDE, *Bedford.*
PHILLIPS, GRACE WINIFRED, *Bedford.*
RUSHWORTH, PHYLLIS HELEN, *Bedford.*
SHOEBRIDGE, ETHEL ROSE, *Bedford.*
SMITH, KATHLEEN IRENE, *Bedford.*
SOUTHERN, HELEN MARY, *Bedford.*
SPEIRS, JESSIE MARGUERITE, *Bedford.*
THEOBALD, JOSEPHINE FLORENCE, *Bedford.*
THORNTON, ELIZABETH THOMSON, *Bedford.*
TOWNSEND, MURIEL BLANCHE, *Bedford.*
TURNER, KATHLEEN MARY, *Bedford.*
WOODGER, DOROTHY HELEN, *Bedford.*
WRIGHTSON, BRENDA MARY DUNNEL, *Bedford.*
WYNESS, MURIEL, *Bedford.*
WYNYARD, WINIFRED AURIOL, *Bedford.*

Inspectors of Nuisances.

ADAMS, ERNEST, *Swinton.*
AGER, LEONARD, *Chelmsford.*
ASHTON, GEORGE, *N. Sydney.*
BAKER, MINNIE GERTRUDE, *Sheffield.*
BARTLETT, CYRIL, *Granville.*
BARTLETT, TOM, *Brinklow.*
BLANCHARD, ALBERT, *Sydney.*
BLANCHARD, JOHN, *Sydney.*
BOCKING, MARY, *Sheffield.*
BOWERS, JOSIAH, *Swansea.*
BRETT, MARJORIE ESTELLE, *S. Tarra.*
BREWSTER-GOW, HAROLD GEORGE, *Herne Hill.*
BUISSON, MARY A., *Sutherland.*
CAWKWELL, GEORGE WRIGHT, *Nottingham.*
CHAPMAN, FRANK EDWARD, *Cottesloe.*
CHESTER, HENRIETTA, *Whitley Bay.*
CLARKE, HERBERT, *Nottingham.*
COLLINS, WILLIAM HENRY, *Plumstead.*
CROSS, ARNOLD, *Littleport.*
CURRELL, ALFRED, *Paramatta.*
CURTAIN, NELLIE, *Annandale.*
DARCH, REDVERS HENRY, *Concord.*
DAVIES, JAMES NEANDER, *Porth.*
DE MOULIN, EILEEN E., *Manley.*
DICKER, RONALD RALPH, *Brentford.*
DICKINSON, THOMAS WILLIAM, *Bourne.*
DINSLEY, KATHLEEN, *Bristol.*
DOUGLAS, GRACE, *Melbourne.*
DUCK, HARRY, *Blackheath.*
DUFFIELD, GEORGE HENRY EDWARD, *Mill Hill.*
ELLIS, JOHN JAMES GLADSTONE, *Hucknall.*
ELSE, CHARLES GLOSSOP, *Fritchley.*
EVANS, RICHARD OLIVER, *Rhondda.*
FLETCHER, GEORGE, *Gosford.*
GAYFER, CLAUDE JOHN, *Lowestoft.*
GILL, JAMES HAMILTON, *Edinburgh.*
GOWER, ALBERT WILLIAM, *Croydon.*
GRAY, WILLIAM, *Lewisham.*
GREENE, WILLIAM RAYWARD, *N. Sydney.*
HALL, MAY ELEANOR, *Auburn.*
HANLEY, JOHN, *Glasgow.*
HEARN, CHARLES JOHN, *St. Albans.*
HEDLEY, HAROLD MILFORD, *Perth.*
HERRING, LESLIE HARRY, *Norwich.*
HIGGINSON, FRANK, *Preston.*
HINCHLIFFE, JAMES, *Meltham.*
HINGSTON, GOSTWYCK GEOFFREY, *Coonabaraham.*
HOLMES, PHŒBE WATERFALL, *Sheffield.*
HOLT, FRED, *Rochdale.*
HORWOOD, CONSTANCE ADELAIDE, *Brighton.*
HUME, ROBERT KENNETH, *Edinburgh.*
JAMES, THOMAS LUKE, *Coburg.*
JENKINS, ALLAN HENRY, *Subiaco.*
JENKINS, ERNEST *Subiaco.*
JONES, REGINALD ALICK, *Catford.*
JONES, RICHARD DAVID, *Bethesda.*
KEMP, ARTHUR LESLIE, *Hurstville.*
KEEN, CHARLES HENRY HOLLAND, *Minehead.*

Kippen, John, *Dundee.*
Macleod, Daisy Mary, *Luton.*
McCormack, Edward John, *Perth.*
McDarmont, John, *Concord.*
McGregor, Donald Robert, *Marylands.*
McKay, Eric Lyle, *Wallsend.*
McKay, Nancy Barbara, *Chatswood.*
McLeish, David Mitchell, *Edinburgh.*
McLeod, Thomas Norman, *Perth.*
Meale, Sidney Percy, *Canterbury.*
Merrilees, Alexander, *Carstairs Junction.*
Milne, John, *Peterhead.*
Moore, Joseph, *Sheffield.*
Newman, Gerald B., *Narrabri.*
O'Donoghue, Olive Janet, *Sheffield.*
Pullin, William, *Portsmouth.*
Parry, Trevor, *Rossett.*
Preshaw, Frederick Charles, *Perth.*
Radcliffe, Lily Stanfield, *Leytonstone.*
Richmond, Daisy D., *Sydney.*
Ridding, Harold, *Dalton-in-Furness.*
Rosenberg, Lawrence Edward, *Newport, I. of W.*
Ross, William, *Manchester.*
Sagar, John Harold, *Ruislip.*
Sandilands, John, *Edinburgh.*
Salt, Harold Owen, *Boscombe.*
Sapsford, May Elizabeth, *Clapham.*
Shrigley, Harold, *Cottesloe Beach.*
Skelton, Clement, *Walker-on-Tyne.*
Smith, Harry Kempe, *Hackney.*
Smith, Samuel William, *Claremont.*
Smith, Sidney William, *Portsmouth.*
Stevens, Ernest William, *Bath.*
Stevenson, Roland, *Eltham.*
Stoney, Stanley Selby, *Paramatta.*
Tassie, William Collis, *Preston.*
Taylor, George Kaye, *Scarborough.*
Thomas, Redvers Harry, *Sherborne.*
Tippett, Chester Charles, *Adelaide.*
Udell, Florence Nellie, *London.*
Ward, Beatrice Susan, *Sheffield.*
Westby, George Ernest, *Rotherham.*
White, Arthur, *Mt. Lawley.*
White, Reginald John, *Bath.*
Wilkins, Frederick William, *Portsmouth.*
Wilson, Arthur, *Perth.*
Woods, Lionel William, *Welwyn.*
Worley, Walter James, *East Ham.*
Wrixon, Henry, *Paddington.*
Wyman, Reginald Leonard, *Maylands.*

Inspectors of Meat and other Foods.

Amos, Douglas James, *Cabra.*
Anderson, Thomas Edward, *Waverley.*
Banks, George, *Liverpool.*
Blake, Frank, *Petersham.*
Drake, Dennis, *Lindley.*
Priestley, Harry, *Blackpool.*
Purslow, William Haynes, *Shrewsbury.*
Shiel, Joseph Henry, *Paddington.*

Tropical Hygiene for Sanitary Inspectors.

Turnbull, Nathaniel William John, *London.*

GENERAL NOTES.

Inspectors of Nuisances Certificate.

The Public Health (Officers) Act of 1921 came into force on 1st April, 1922, and certificates awarded at the Institute's Examination after that date will be worded as for "Sanitary Inspectors."

For those who obtained the Inspectors of Nuisances Certificate before 1st April, 1922, the following statement has been prepared :—

Examinations for Sanitary Officers.

The provisions of the Public Health (Officers) Act, 1921, substitute the title Sanitary Inspector for that of Inspector of Nuisances, and the Royal Sanitary Institute will, from the date at which the Act comes into operation, 1st April, 1922, adopt the new title for their examination and certificate.

It is not practicable to alter the title on Certificates already issued, but this statement can be associated with the Certificate by the holder.

By Order of the Council, February, 1922.

E. White Wallis,
Secretary.

A copy of this statement, printed on parchment, will be sent to holders of certificates upon their sending a request to the Institute, giving the number and date of their certificate, and enclosing a stamped addressed envelope.

The Ministry of Health have issued an Order taking effect this month, and in it the Certificate of the Royal Sanitary Institute is named as a qualification for Sanitary Inspectors in cases where half the salary is repaid to the Local Authority.

DOMINION AND FOREIGN NOTES.

The Branch in South Africa maintains its numerical strength, and Mr. W. J. Perrott, B.A., has been appointed as Secretary and Treasurer of the Branch.

In New Zealand arrangements are in hand for reviving the Branch, which was dissolved in 1915 owing to the war. It is hoped to form a strong Branch in the Dominion, and new Members and Associates will be welcomed.

The authorities in New South Wales have under consideration the question of forming a Branch in the State.

During the month of April the following representatives from the Over-

seas Dominions have visited the Institute for the purpose of obtaining information and taking part in the Institute's work :—Mr. Wallace Bruce, Member of the City Council of Adelaide, came with an introduction from the Chairman of the Central Board of Health ; Dr. J. B. Davey, of Dar-es-Salaam, East Africa ; Dr. Gunasekara, Assistant Sanitary Commissioner of Ceylon ; Dr. A. Stanley, Shanghai ; and we have been very pleased to meet them as co-workers in the cause of public health.

Delegates to the Congress at Bournemouth in July have been appointed by a number of the Dominion Governments and Municipalities. A list is given on page 130.

The first Examination in Tropical Hygiene for Sanitary Inspectors taking appointments in tropical stations was held in London, on April 20th and 21st. The Council have authorised the extension of the Tropical Hygiene Examination to the British West Indies Board of Examiners. It was fortunate that Dr. Minett, the Secretary of that Board, was in England, and was able to take part in the London Examination.

A communication has been received from the Medical Officer of Gibraltar, saying that they require the Institute certificate for Inspectors' appointments.

Strasbourg Exposition, May-October, 1923.

To mark the centenary of the birth of Louis Pasteur, the Institut Pasteur of Paris, the University, and the City of Strasbourg are arranging for an International Inter-allied Hygienic Exposition. Full information regarding the Exposition can be obtained of "Exposition Inter-alliée d'Hygiene, Strasbourg, 1923, 2e Section, Hygiene Urbaine, 1, Quai Lezai-Marnésia, Strasbourg."

FORTHCOMING MEETINGS.

Health Week.

His Majesty the King, and Her Majesty the Queen, have graciously accorded their patronage to Health Week, which is to be held from October 8th to 14th. The Right Hon. The Lord Mayor of London has consented to act as Chairman of the General Committee.

Members of the Institute are invited to co-operate in promoting the success of the movement. Those prepared actively to assist are asked to send in their names to the Secretary,

Examinations.

In Sanitary Science as applied to Buildings and Public Works, for Sanitary Inspectors, Maternity and Child Welfare Workers, Women Health Visitors and School Nurses, and School Hygiene, including Elementary Physiology, will be held at :—

Belfast, May 5th and 6th.
Manchester, May 12th and 13th.
Leeds, May 19th and 20th.
Liverpool, May 26th and 27th.
Cardiff, June 16th and 17th.
Glasgow, June 23rd and 24th.
Birmingham, June 30th, July 1st.
London, July 14th and 15th.
Trinidad, B.W.I., July.
Melbourne, Victoria, November, 1922.

For Inspectors of Meat and other Foods :—

Birmingham, June 9th and 10th.

BOURNEMOUTH CONGRESS.

THE THIRTY-THIRD CONGRESS OF THE INSTITUTE WILL BE HELD IN BOURNEMOUTH, FROM JULY 24TH TO 29TH, 1922.

PRESIDENT OF THE CONGRESS.

MAJOR-GENERAL THE RIGHT HON. J. E. B. SEELY, C.B., C.M.G., P.C., D.S.O., M.P. (LORD LIEUTENANT OF HAMPSHIRE).

Chairman of Local Committee.

THE RIGHT WORSHIPFUL THE MAYOR OF BOURNEMOUTH.
(Alderman Chas. H. Cartwright).

Hon. Local Treasurer.

C. R. HALEY (Borough Treasurer).

Hon. Local Secretaries.

HERBERT ASHLING, Town Clerk.
A. D. EDWARDS, M.B., B.Sc., D.P.H., Medical Officer of Health.
W. G. COOPER, F.I.S.E., Chief Sanitary Inspector.

Order of Proceedings.

SATURDAY, 22nd July, 1922.

12.0 noon. The Congress Reception Room in the Municipal College will be open at 12 noon.

SUNDAY, 23rd July.

11.15 a.m. Service at St. Peter's (the Parish Church).

MONDAY, 24th July.

1.0 p.m. Reception of Members and Delegates by HIS WORSHIP THE MAYOR. Public Luncheon, Town Hall. (*Tickets 5/- each.*)

3.0 p.m. Opening of the Health Exhibition in the Hants Drill Hall, by HIS WORSHIP THE MAYOR.

5.0 p.m. Inaugural Address to the Congress, by the PRESIDENT (MAJOR-GEN. THE RIGHT HON. J. E. B. SEELY, C.B., C.M.G., P.C., D.S.O., M.P., at the Town Hall.

THE RT. HON. THE EARL OF RADNOR in the Chair.

TUESDAY, 25th July.

10.0 a.m. Meetings of Sections and Conferences in the Municipal College.
Section A.—Sanitary Science and Preventive Medicine.
Conferences of Engineers and Surveyors, Veterinary Inspectors and of Health Visitors.

2.30 p.m. Excursion by Motor to the New Forest via Christchurch, Hinton to Wilvery Post. Separate here, and half of cars proceed via Brockenhurst, Lyndhurst, Lymington, Milford-on-Sea to Highcliffe Castle for Garden Party. Second half proceed via Burley, Ringwood, Avon Valley, to Heron Court for Garden Party. (*Tickets 7/- each.*)

8.0 p.m. Popular Lecture, by Prof. Leonard Hill, M.B., F.R.S., at the Town Hall. The Earl of Malmesbury will preside.

WEDNESDAY, 26th July.

10.0 a.m. Meetings of Sections and Conferences in the Municipal College.

Section A.—Sanitary Science and Preventive Medicine.

Section E.—Industrial Hygiene.

Conferences of Veterinary and Sanitary Inspectors.

2.30 p.m. Motor Excursions via West Cliff Drive, Canford Cliffs, Shore Road, for a visit to inspect the following works, and, by the kind invitation of the proprietors, tea will be provided :—

(1) Messrs. Thos. Wragg & Sons, Ltd., South Western Pottery, Parkstone.

(2) Messrs. Sharp, Jones & Co., Bourne Valley Pottery and Rock Concrete Tube Works, Parkstone (limited to 100).

(3) Messrs. Carter & Co., Ltd., Encaustic Tile Works, Poole (limited to 100).

3.15 p.m., return at 5.45 p.m. Alternative Boat Trip to Swanage (not yet definitely settled). (*Tickets 2/3 each, exclusive of Pier Tolls*). For Reception by the Swanage Urban District Council.

8.0 p.m. Conversazione and Reception, by the Mayor and Corporation of the County Borough of Bournemouth, at the Town Hall.

THURSDAY, 27th July.

10.0 a.m. Meetings of Sections and Conferences in the Municipal College.

Section B.—Engineering and Architecture.

Section C.—Hygiene of Maternity and Child Welfare, including School Hygiene.

Section D.—Personal and Domestic Hygiene.

Conference of Representatives of Sanitary Authorities.

2.30 p.m. (1) Motor Excursion via Meyrick Park, Winton, Kinson, Canford Village to Waterworks at Wimborne and Alderney ; (2) Trip via Overcliff Drive, Branksome Park, Canford Cliffs, Sandbanks, Poole Park to Gasworks at Poole. (*Tickets 6/- each.*)

Reception and Tea by the Bournemouth Gas and Water Co.

8.0 p.m. Special Concert at the Winter Gardens, and Special Film on the Rat Pest and Extermination, kindly lent by the Vermin Repression Society.

FRIDAY, 28th July.

10.0 a.m. Meetings of Sections and Conferences in the Municipal College.

Section B.—Engineering and Architecture.

Section C.—Hygiene of Maternity and Child Welfare, including School Hygiene.

Section D.—Personal and Domestic Hygiene.

Conference of Medical Officers of Health.

1.0 p.m. Closing Meeting at the Municipal College.

2.30 p.m. Circular Drive via Boscombe Overcliffe Drive to Southbourne, Tuckton Corner, Carbery Avenue, King's Park, down Holdenhurst Road to Cooper Dean's Corner ; turn left to Kinson, Bear Cross, Newtown, top of Constitution Hill to Poole ; for Reception by the Mayor and Corporation of Poole. (*Tickets 6/- each.*)

8.0 p.m. Congress Dinner.

SATURDAY, 29th July.

10.30 a.m. Boat Trip (1) All Day Trip to Southampton. Invitation from the White Star Line to inspect the " Olympic," similar invitation from the Cunard Steamship Co. to inspect the " Mauretania," and tea will be provided for 500 by each company. (*Boat Trip Fare 6/- each, excluding Pier Tolls.*)

In lieu of the Boat Trip to Southampton arrangements have been made for those who would prefer to go by road for—

Motor Trip (2) via Christchurch, Lyndhurst to Southampton, returning via Rufus Stone, Ringwood to Bournemouth. (*Motor Trip Tickets 7/6 each.*

All Motor Coach Trips will start from the Municipal College (in the Meyrick Road), and Boat Trips from Bournemouth Pier.

The Bournemouth Corporation have granted facilities as follows :—

Golf.—Meyrick and Queen's Parks (links). (For further particulars please apply to W. H. Harrison, Esq., Branksome Hall, who has kindly consented to arrange details.)

BOWLS.—Bowling Greens at Alum Chine, Argyll Gardens, Boscombe Cliff, King's Park, Knyveton Gardens, Meyrick Park, Southbourne and Winton Recreation Ground.

TENNIS.—Courts at Alum Chine, Argyll Gardens, Boscombe Gardens, Central Gardens, Knyveton Gardens, King's Park, Meyrick Park and Winton.

PIERS.—Free admission to Bournemouth and Boscombe Piers.

TRAMS.—Free use of Corporation Tramcars on production of Congress Tickets.

The HEALTH EXHIBITION will be held in the Hants Drill Hall from July 24th to July 29th, 1922.

The following Government Departments, and Dominion and Foreign Governments and Municipalities, have appointed Delegates to the Congress :

Government Departments.

Board of Control, England.
Ministry of Pensions.
H.M. Office of Works.
War Office.
Scottish Board of Health.

Foreign and Dominion Governments and Municipalities.

Calcutta.
Ceylon Medical College.
Province of Quebec, Canada.
Province of Ontario, Canada.
Newfoundland.
Western Australia.
South Australia.
Adelaide, South Australia.
New South Wales.
Victoria, Australia.
Hobart, Tasmania.
New Zealand.
Christchurch, New Zealand.
Durban, South Africa.
Kimberley, South Africa.
Port Elizabeth, South Africa.
The West Indian Centre of the R.S.I.
Hong Kong.
Shanghai.
Singapore.
Roumania.
Denmark.
Greece.

Among the Subjects on which Discussions are being arranged are :—

"The need for extension of Maternity and Child Welfare Work."
"The Functions of the School Medical Service in relation to Preventive and Curative Medicine."
"Should the provision of Liquid or Dried Milk for Infants' Foods and Meals, in connection with Maternity and Child Welfare Centres be encouraged."

" Functional Nervous Diseases in the Child."
" Enlarged Tonsils and Adenoids in relation to Health and Education."
" Village Water Supplies."
" Combined Water Supply over large areas."
" Difficulties arising out of the Change of Policy in Housing."
" Town Planning."
" Sanitary Annexes to Ward Blocks."
" Relation of Public Health Authorities to the Poor Law."
" Is the best use made of Fever Hospitals."
" Propaganda Work, and the Education of the People."
" Are the present V.D. Clinics successfully fulfilling their Functions."
" Venereal Diseases. Methods of Securing Continuous Treatment of Infective Persons."
" Legal Prevention of Degeneracy."
" Water-borne Dysentery."
" Tuberculosis."
" Constructive Welfare Work in Modern Industry."
" Occupational Sickness."
" Sanitary Facilities in Works."
" Unemployed and its Relationship to Health."
" The Milk Question."
" Dental Caries."
" Modern Practice in the Manufacture, Distribution and Utilization of Gaseous Fuel, with special reference to the Public Health and the Gas Regulation Act, 1920.
" Electricity in the Home."
" Domestic Heating and Ventilation."
" Housing Schemes in Glasgow with special reference to Smoke Abatement."
" Homesteads in Exposed Positions."
" The Labour-saving House."
" The Elusive Ideal Home."
" Sunlight and Health."
" The Sphere of Personal Hygiene."
" Health Resorts."
" Outfalls for Health Resorts."
" Refuse Disposal for small Towns on Salvage Principles."
" Rain Water for Villages."
" The Collection and Disposal of Excreta in a small Oriental Village."
" Are the present methods of Disinfection worth while ? "
" Meat and Food Inspection."
" Slums and Slum Life."
" Smoke Abatement."
" The Incidence of Anthrax."
" Humane Slaughtering of Animals."
" Food Supplies."

LIST OF MEMBERS AND ASSOCIATES

ELECTED MARCH, 1922.

MEMBERS.

* Sanitary Science Certificate.
w Maternity and Child Welfare Workers' Certificate.
§ Sanitary Surveyors' (India) Certificate.
‡ Inspectors of Nuisances' Certificate.
m Meat Inspectors Certificate.
v Women Health Visitors and School Nurses' Certificate.
s School Hygiene Certificate.

4883 1922. Mar. *ALLAN, Charles Scott, *"Llandudno," Marine Parade, Seatown, Wellington, New Zealand.*

4877 1922. Mar. DEAN, Frederick William, *31, Marylebone Lane, W. 1.*

4878 1922. Mar. EVANS, Lieut., Charles Thomas Morris, R.E., *Inspector of Works and Assistant Divisional Officer, Eastern Command, 45, The Common, Woolwich.*

4886 1919. Oct. HOWTH, Mahamed, B.SC.(GLASG.), *Engineers' Office, Madura Municipality, Madura, India.*

4884 1922. Mar. *KESVAN, Meiyur, *34, Daraswarar Gardens, Vepery P.O., Madras, India.*

4879 1922. Mar MANTLE, R. W., *Works Assistant to the Senior Engineer, Health Branch, P.W.D., Delhi, India.*

4885 1922. Mar. ‡*MORRIS, Wilfred, *Engineer and Surveyor, Cadwin, Withiel, Bodmin, Cornwall.*

4880 1922. Mar. OATES, Edgar, *Sanitary Engineer and Master Plumber, 19, Lees Road, Oldham, Lancs.*

4881 1922. Mar. SANDERSON, George Meredith, M.R.C.S., L.R.C.P., C.T.M., *Sanitation Officer, Qomba, Nyasaland, Africa, (45, Chesterton Road, Cambridge.)*

4882 1922. Mar. SOVANI, Hari Vishnu, B.E.(BOMB.), *Venkatpeth, Bagalkot, District Bijapur, Bombay, India.*

ASSOCIATES.

8752 1922. Mar. ‡BARTLETT, Percy Howard, *Tregenna, Lerryn, Lostwithiel, Cornwall.*

8753 1922. Mar. *‡*m*COLVIN, Charles Lamb, *398, Argyle Street, Hobart, Tasmania.*

8754 1922. Mar. *s*EDGHILL, Miss Joan, *Bramber, Hale, Altrincham Cheshire.*

8755 1922. Mar. ‡*m*FRANCIS, William, *40, Gilfach Cynon, Merthyr Tydfil, Glam.*

8756 1922. Mar. ‡FULCHER, Peter, A.M.C.I., *Montpellier Chambers, Montpellier, Cheltenham.*

8756 1922. Mar. ‡HARRIS, Victor S., *26, Fir Parade, Ravensthorpe, Dewsbury.*

8757 1922. Mar. ‡HIGGINSON, Frank, *23, Castleton Road, Preston.*

8758 1922. Mar. ‡HOLT, Fred, *12, Mark Street, Rochdale.*

8759 1922. Mar. ‡*w*HONNEYMAN, Miss Viola, *32, Springfield Mount, Leeds.*

8760 1922. Mar. ‡HOOPER, James Thomas, *13, South Lane, Kingston-upon-Thames.*

8761 1922. Mar. *v*KILNER, Miss Margaret, *Clyde House, Dawlish, Devon.*

8762 1922. Mar. ‡LEACH, Inon John, *Oakdene, Crediton, Devon.*

8763 1922. Mar. *v*PARKIN, Miss Aline, *226, Harnby Road, Blackpool.*

8764 1922. Mar. ‡RIDDING, Harold, *137, Chapel Street, Dalton-in-Furness.*

8765 1922. Mar. ‡ROSS, William, *12, Clarendon Road, Chorlton-upon-Medlock, Manchester.*

8767 1915. Oct. *v*TAYLOR, Miss Annie, *40, Highbury Grove, Islington, N. 5.*

ELECTED APRIL, 1922.

FELLOWS.

730 1892.
F. 1922. Apr. BLIZARD, John Henry, M.INST.C.E., F.S.I., *Castel Lane, Southampton.*

4047 1917.
F. 1922. Apr. BUTTERWORTH, John James, M.D., D.P.H. (*M.O.H.*), *Lancashire County Council, County Offices, Preston.*

1074 1897.
F. 1922. Apr. COOK, Frederick Charles, D.S.O., M.C., A.M. INST.C.E., *Ministry of Transport, Roads Department, 7, Whitehall Gardens, S.W. 1.*

1774 1904.
F. 1922. Apr. GAIR, James, A.M.INST.C.E., *Town Hall, Marylebone Road, N.W. 1.*

3739 1914.
F. 1922. Apr. HASTINGS, Charles J. C. O., M.D. (*M.O.H.*), *City Hall, Toronto, Ontario, Canada.*

2247 1907.
F. 1922. Apr. HICKS, William Rooke, F.S.I., A.M.INST.C.E., *Town Hall, Ealing, W. 5.*

2401 1908.
F. 1922. Apl. LUKE, John, F.S.I., *Town Hall, Manchester.*

1928 1905.
F. 1922. Apr. MOSTYN, Sidney Gwenffrwd, M.A., M.B., M.R.C.S., L.R.C.P., D.P.H. (*M.O.H.*), *Health Office, Feethams, Darlington.*

2738 1909.
F. 1922. Apr. SHENTON, Henry Chawner Hine, *28, Victoria Street, S.W. 1.*

4710 1921.
F. 1922. Apr. WYNNE, Frederick Edward, B.A., M.B., B.CH., D.P.H. (*M.O.H.*), *Town Hall, Sheffield.*

MEMBERS.

4887 1922. April BANISTER, Robert Sydney, *Plumber and Sanitary Engineer, Umberslade Road, Selly Oak, Birmingham.*

4898 1911. Jan. ‡*Biggs, William Harry, *Sanitary Inspector, Council Offices, Trinity Square, Axminster.*

4888 1922. April ‡*m*Davis, Richard James, *Lithgow Villa, 3, Spencer Road, Mitcham Junction, Surrey.*

4889 1922. April ‡*m*Evans, Daniel Morgan, *3, Castle Street, Barry, Glam.*

4890 1922. April Gebbie, Nicholas, M.B., CH.B., D.P.H., M.D., (*M.O.H.*), *Public Health Department, Town Hall, Hyde, Ches.*

4899 1919. Mar. ‡*m*Henderson, R. E., *Town Hall, Glenelg, South Australia.*

4891 1922. April ‡*m*Jenkins, James, *Surveyor and Sanitary Inspector, Park View, Ryton-on-Tyne.*

4896 1922. April *‡Lindsay, Eustace Coultra Sheppard, *23, Cross Roads, Highgate, South Australia.*

4892 1922. April Miller, Ernest Edward, *55, Boileau Road, Ealing, W.*

4897 1922. April *Reeve, Harry Austin, *Long Stratton, Norfolk.*

4893 1922. April Scott, William, *Master Plumber, 11, Park Road, Hebburn-on-Tyne, Durham.*

4894 1922. April Treverton, Arthur Allen, *22, Abbott Road, Lucknow, India.*

4895 1922. April Vallis, Eric Walter Harry, *Surveyor's Office, Dulverton, Somerset.*

4900 1922. April Williams, Walter Quintin, C.E., *1003, Rue du Quai, Port-au-Prince, Haiti, West Indies.*

ASSOCIATES.

8768 1922. April *v*Flamank, Miss Alys, *Beacon House, Summercourt, Grampound Road, Cornwall.*

8769 1922. April ‡Gayfer, Claude John, *7, Albany Road, Lowestoft.*

8777 1913. Dec. ‡Jones, Frederick William, *127, Hanover Street, Sheffield.*

8770 1922. April ‡Kippin, John, *28, Flight's Lane, Lochee, Dundee, Scotland.*

8771 1922. April ‡Lee, Miss Annie Rosina, *2, Halsdon Terrace, Torrington, Devon.*

8772 1922. April ‡Penney, Alexander, *2, Bright Terrace, Dick Lane, Brinscall, Lancaster.*

8773 1922. April ‡Smith, Sidney William, *78, Alver Road, Kingston, Portsmouth.*

8774 1922. April ‡Stenlake, Charles Morley, *2, Rock Park, Tavistock, Devon.*

8775 1922. April ‡Thomas, Redvers Harry, *Stamford House, Sherborne, Dorset.*

8776 1922. April *v*Varey, Mrs. Gertrude, *131, Park Street, Haydock, near St. Helens, Lancs.*

OBITUARY.

ALFRED HILL, M.D., F.R.S.E., F.I.C.
(Fellow).

It is with great regret that the Council of the Institute is called upon to record the death of another of its Fellows in the person of Dr. Alfred Hill, who died at Freshwater, Isle of Wight, on February 22nd.

Dr. Hill would have reached the advanced age of 96 had be been spared until May 19th of this year. He had been in retirement during the past 18 years, so that probably a good many of the younger members of the Public Health profession will not be able to appreciate the position which he occupied in the Public Health life of this country during a period of more than thirty years.

Dr. Hill had the great advantage of having had first of all a wide general experience in medicine and a first-class training in Chemistry and Physics, for very early in his career he was appointed Professor of Chemistry at Sydenham College, Birmingham, afterwards Queen's College. He was one of the first Public Analysts in this country, and many of the improvements in the methods of analysis and investigation into food adulteration were due to him. In those early days there were few standards to guide one, and, therefore, the work of an analyst was no light task.

He was appointed Medical Officer of Health for the City of Birmingham in 1873, a position which he held with much success, and with great benefit to the City till 1903, a period of 31 years. During his period of office great events happened in the City, in the direction of the development of the town, the disposal of sewage, the water supply, housing, and a variety of miscellaneous problems which called for good judgment on the part of the officer advising the City Council. Dr. Hill's experience in these matters, and his sound common sense, made him one of the best recognised authorities upon Public Health, and his advice was sought far and wide on difficult problems.

To the writer, who followed in his footsteps as Medical Officer of Health, it has always been a keen pleasure to find that the public appreciated Dr. Hill's life work and recognised the high standard of devotion to the public welfare which characterised it.

Dr. Hill was President of the Society of Public Analysts, he was one of the original founders of the Society of Medical Officers of Health, as it now exists, and was one of its first Presidents. During his whole active career he took a great interest in the Royal Sanitary Institute and its work, and was seldom absent from its annual congresses.

At Newcastle, in 1896, he was President of the Conference of Medical Officers of Health, and at Birmingham, in 1898, he presided over Section "A" Sanitary Science and Preventive Medicine. He was elected a Member of the Parkes Museum in 1883 and a Fellow of the Institute in 1890.

J. R.

It is with regret that we have to announce the death of the following Fellow, Members, and Associates :—

Fellow.—William Morgan Robbins, of Staten Island, N.Y. City. He was a Fellow of the Sanitary Institute of Great Britain in 1881, and he had been engaged in engineering work in Canada and the United States for the past 30 years.

Members.—Sydney Taylor Champtaloup, M.D., Ch.B., D.Sc., D.P.H. He was the Professor of Bacteriology and Public Health at the University of Otago, New Zealand, and a member of the Institute's Board of Examiners for that Dominion. He rendered valuable services to the New Zealand Military Authorities during the war, especially in connection with the bacteriological diagnosis of cerebro-spinal fever affecting trainees in camps ; and he also gave great assistance during the influenza epidemic of 1918. He was in England in 1920, and attended the Birmingham Congress.

Louis F. G. Loretz, of Ealing. He had been a member of the Institute for 18 years.

Associates.—Wilfred Wesley Eason, of Fulham.

John Hutton, the Superintendent Sanitary Inspector of Accra, Gold Coast, who died of blackwater fever last November.

Lawrence Plewes, of Goole.

Albert John Woodman, of Brixham.

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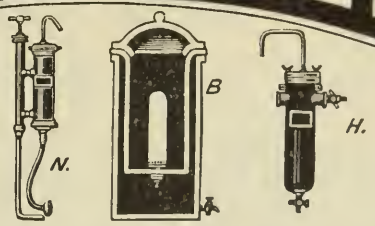

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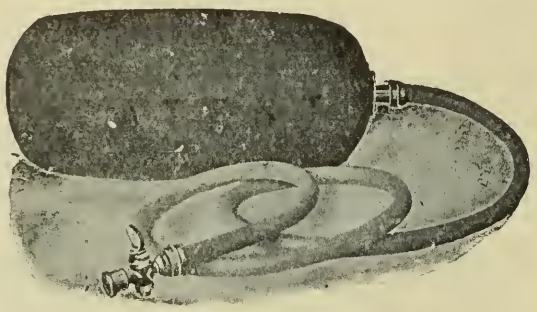

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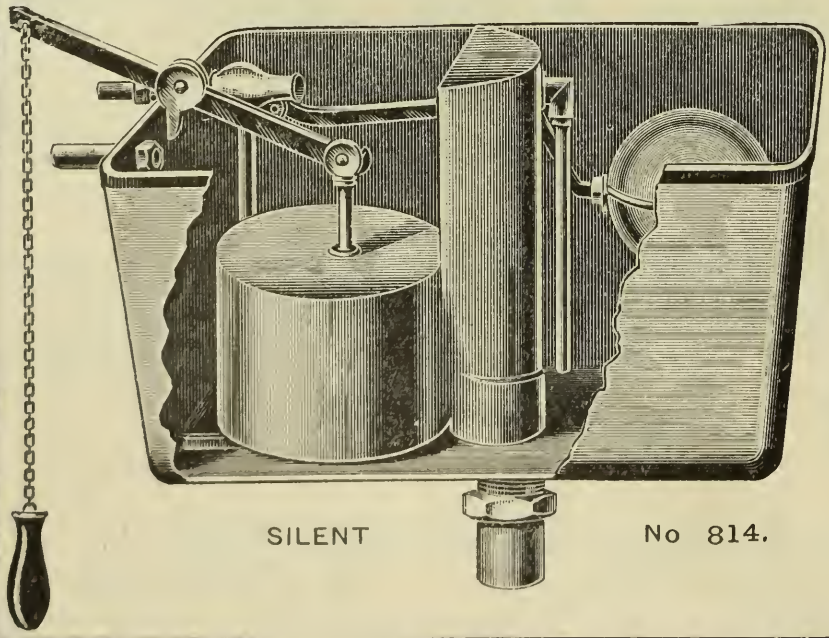

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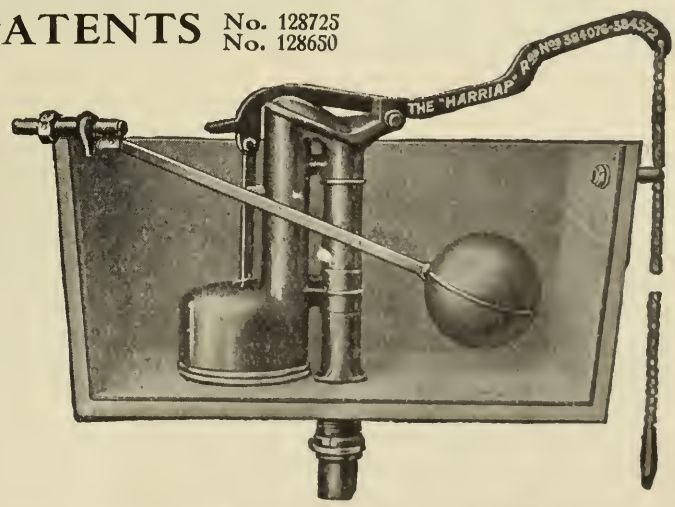

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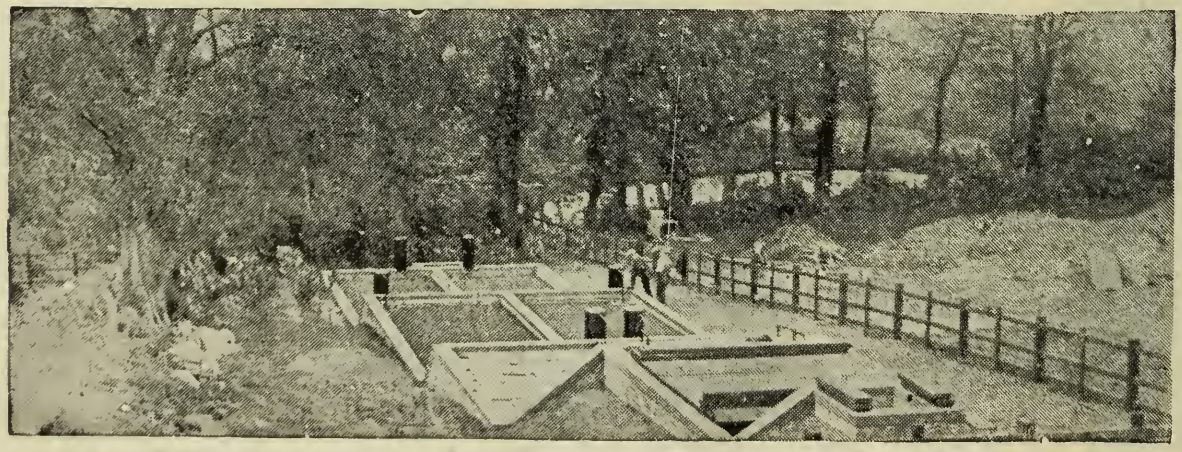

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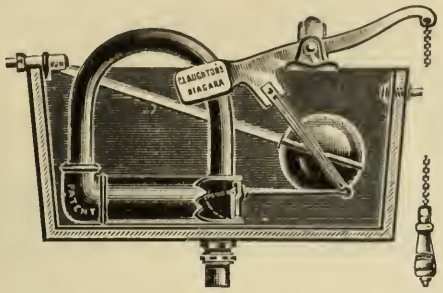

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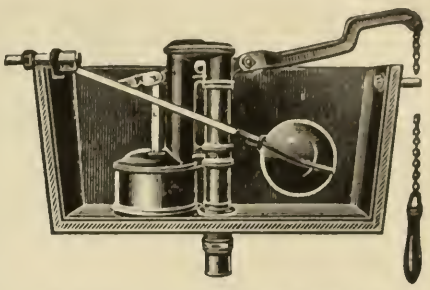

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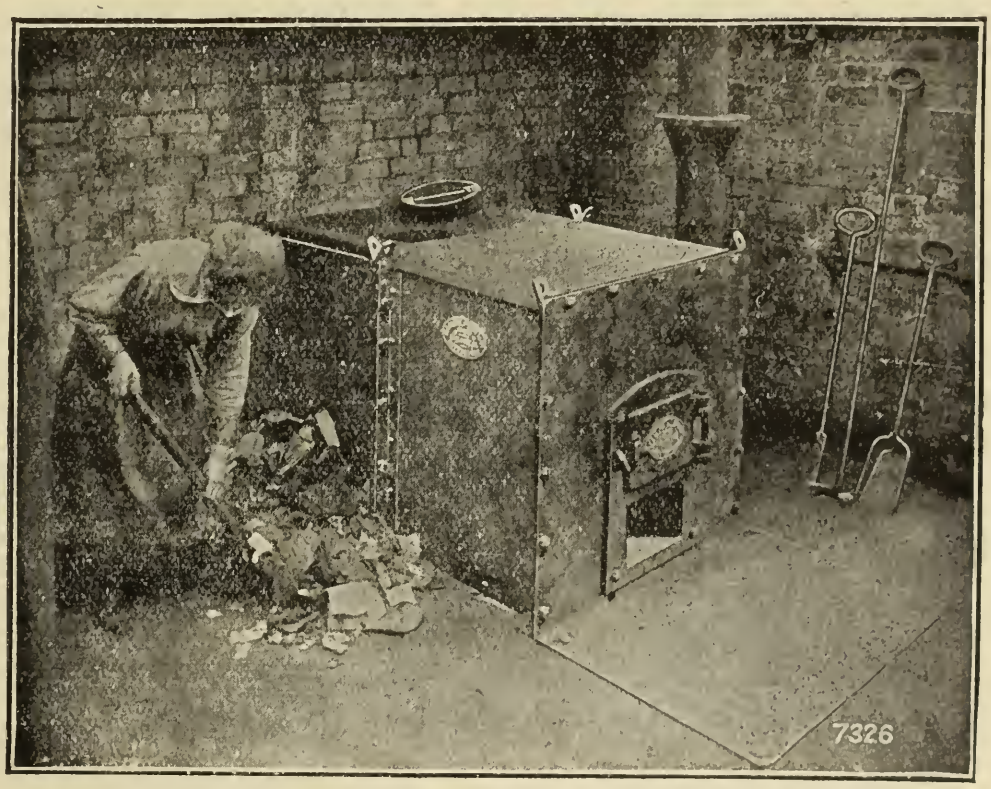

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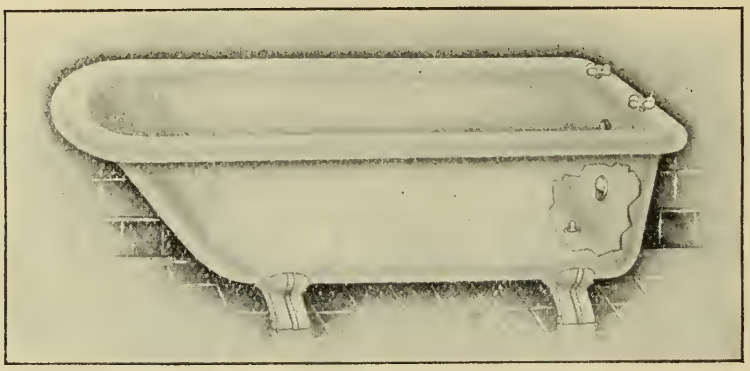

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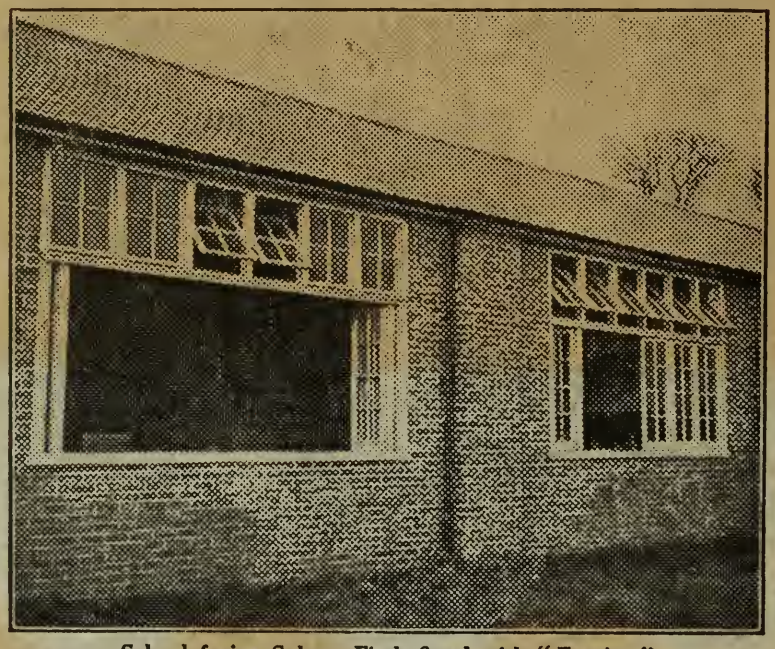

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